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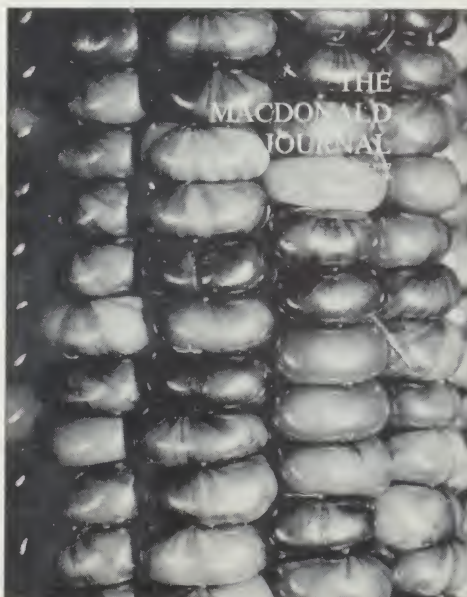
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Fifty years ago corn was allowed to interpollinate freely, often providing a vast array of colour within a single ear. The beautiful colours expressed in this photograph by Jean-Paul Proulx, of Photo Plus in Ste. Anne de Bellevue, have all but been lost in our present day, highly bred, yellow-seeded hybrids. Small plantings of Indian corn can still be found occasionally for the production of ears for decorative purposes. As we appreciate the cover so do we appreciate the excellent selection of articles centred around the theme of Crop Improvement. Exciting times for plant scientists as they strive for, as Serge Lussier would say, elusive perfection.

Guest Editorial

Crop Improvement: An Ongoing and Essential Endeavour

by Professor H.R. Klinck
Chairman, Department of Plant Science



Crop improvement means different things to different people. To plant breeders and scientists who support them it means genetically improved cultivars. To the agronomist it means better management techniques, including the use of pedigreed seed of improved cultivars.

Crop improvement, or the improvement of crops, has been a part of human activity since the beginnings of agriculture some 10,000 years ago. The first crop plants grown under a managed system would not be acceptable in today's agriculture. Wild grains (take wild oats as an example) shatter prematurely, produce small seeds with thick husks, and exhibit prolonged dormancy characteristics. Early farmers, perhaps unconsciously, practiced selection. In the harvesting process they most likely gathered the seeds that remained on the plant until fully ripe; they probably found large seeds easier to clean and prepare for food; seeds capable of germinating and producing a crop in the next season would have limited dormancy. Thus human intervention resulted in improved plant types. With few exceptions, all of our present-day crop plants were developed in this manner.

Associated with the selection of improved plants was the evolution of better cropping practices. Farmers gradually learned how to manage their crops to reduce competition from weeds or damage by insects and diseases, thus contributing further to crop improvement.

Early crop improvement in Canada consisted mainly of importing plants, seeds or other propagules from old world areas and selecting those adapted to our conditions. With the development of government, university, and private sector research facilities over the past 100 years, both the breeding and the management of improved crop plants have made remarkable progress.

In the plant breeding context the development of improved cultivars has been achieved by the application of the principles of Mendelian genetics. Various methods are employed, ranging from those developed about a century ago, entailing the hybridization of existing parental materials and selecting offspring for various traits, through the development of hybrids for direct commercial use, to the use of modern biotechnology to reduce cultivar development time. While the plant breeder usually gets the credit for new cultivars produced, success could not be accomplished without the direct or indirect assistance of other scientists. It is possible, for example, to incorporate genetic resistance to stem rust in wheat cultivars, but only with the help of plant pathologists who have assembled information on the problematical races or biotypes of rust. With the help of plant physiologists it has been possible to breed daylength insensitive cultivars, thus extending their adaptation to wider latitudes, such as has been done with short-season soybean cultivars in Canada. Chemists have played a role, with breeders, in altering the composition of certain crop seeds to improve their quality, such as malting quality in barley and oil quality in rapeseed. Other scientists, such as entomologists, cytologists, and geneticists, have made and continue to make important contributions by working with plant breeders. Equally important to the process are those scientists responsible for collecting and preserving plant gene resources. As new diseases or other pests develop, and as market demands change, new genes will have to be incorporated in improved cultivars to protect them and to meet market requirements. Legal protection is needed to stimulate further cultivar development and exchange with other countries,

hence the current interest in plant breeders' rights legislation.

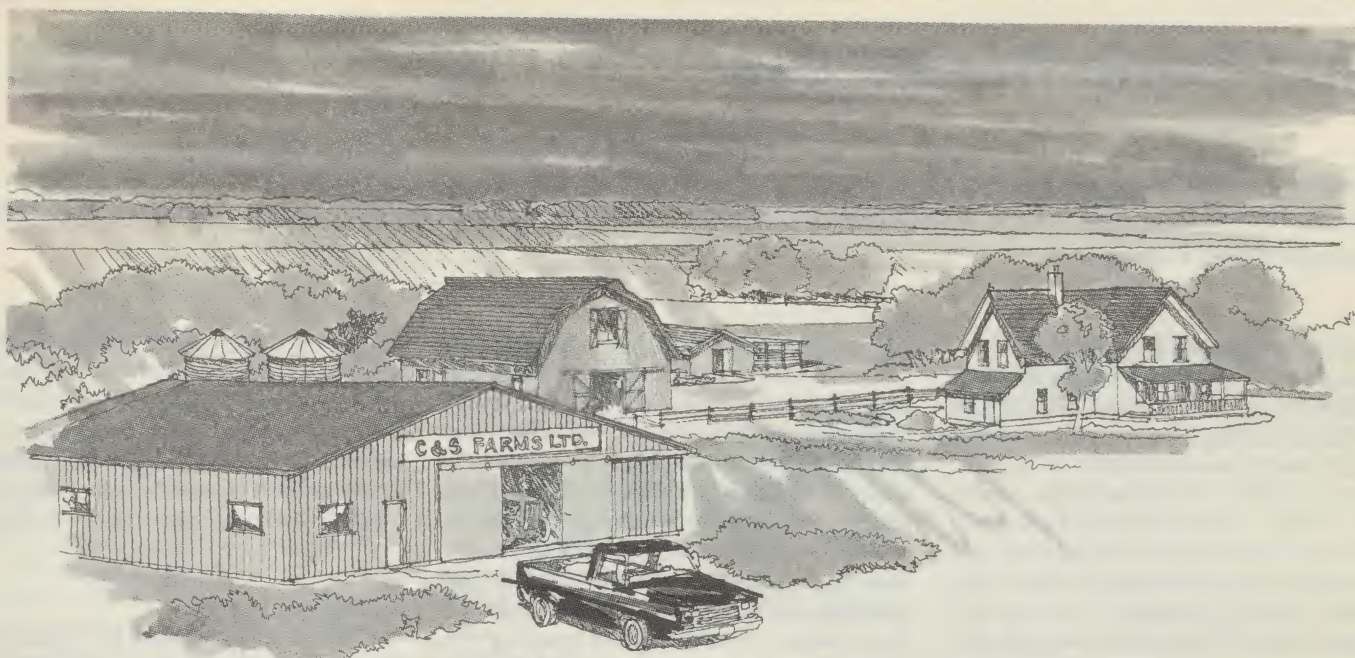
The rapidly developing field of biotechnology, involving genetic engineering and tissue culture techniques, both to facilitate the introduction of genetic materials from other species, or even other genera, and to speed up cultivar development will provide a significant contribution to crop improvement. Biotechnology creates new tools for the plant breeder but is unlikely to make traditional plant breeding redundant.

In the context of crop improvement through crop management activities, studies involving the transfer of biologically fixed nitrogen from legumes to non-legume species through mycorrhizal soil fungi is an exciting field of research endeavour that could ultimately lead to better production practices.

In this Journal issue, attention is focussed on a number of crop improvement techniques alluded to in the foregoing paragraphs. It is recognized, however, that many other aspects of crop improvement have not been dealt with, such as the effects of fertilizer, growth regulators to modify plant morphology, and many other management inputs.

Modern science and technology have contributed much to our knowledge of crop improvement. However, we are a long way from the perfect cultivar or the perfect recipe for maximizing crop yields within economic constraints. To stop developing new cultivars and new production strategies would be to move backward. As world population increases, the demand for human food and livestock feed will increase. Considerable prime land is lost to industrial expansion each year and only limited areas are available for new agricultural development. Hence, increased productivity on existing land will be necessary. This can be accomplished through crop improvement.

Crop improvement has been practiced for 10,000 years, and it will continue to be a significant part of human endeavour in the centuries ahead.

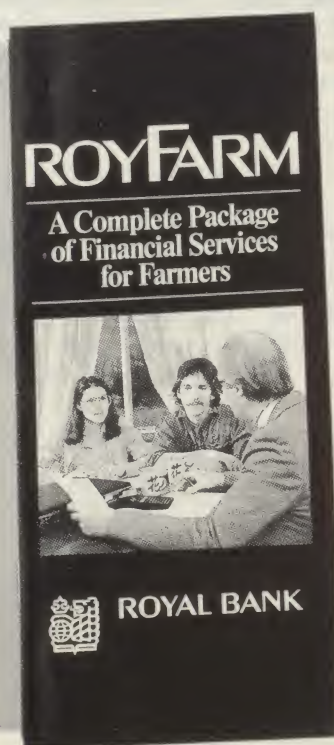


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Plant Gene Resources

by Professor B.E. Coulman

Department of Plant Science

Plant breeders throughout the world have had great success in producing a wide range of high yielding, well adapted cultivars for almost all of our major crop species. As well as yield, many improvements in quality, disease resistance, insect resistance, and a host of other characteristics have been achieved. These improvements have not been confined to the developed nations. The so-called "green revolution" of the late 1960s and early 1970s led to the introduction of improved cultivars of crops such as wheat and rice into a number of developing countries. This produced great increases in production such that in certain countries these crops are now exported in some years.

The majority of the world's important crops originated in regions that are in some cases far removed from their present areas of major production. Figure 1 shows where the centres of diversity of our major crop species are found. This is where one finds the older "land races" which are genetically diverse, relatively unselected populations, and have been cultivated for many hundreds, or even thousands, of years by farmers in these regions. In addition many of the relatives of our crop species are found growing wild in these centres of diversity. Note that not one of the centres is found in Canada.

In many of the centres the "green revolution" has led to the replacement of the land races with high yielding, genetically pure cultivars. In addition some of the land, where the wild relatives of our crops are found, has been brought into cultivation. Thus, we are progressively losing the ancestral and related populations of our crop species. Is this a serious problem? Of what value are these unimproved populations to today's plant breeder?

At the beginning of this century, plant breeding programs used the land races as source material. Single line selections were made from these races to produce higher yielding, more uniform cultivars. Once these pure line cultivars were selected, breeders had no further genetic variation on which to select; thus they began making crosses among these

lines to generate variability. Although our modern cultivars are far removed from the land races, their pedigrees can be traced back to them. These so called primitive cultivars, although they are quite non productive by today's standards, represent the greatest source of variability in our crop species. In addition in many species crosses can be made with wild relatives which represent another potential source of genetic variation for our crop species. In modern plant breeding programs there are numerous examples where land races and wild relatives have contributed important characteristics, such as disease resistance and quality factors, to our present day cultivars. If we lose these basic populations, we may lose forever the array of genetic variability of our crop plants. When we need a new gene for disease resistance, we may not be able to find it.

Our plant genetic resources can be preserved in "gene banks." Seeds are collected and stored under conditions of low temperature and humidity and further seed produced when viability declines. Such banks have

existed in countries such as the United States and the U.S.S.R. for many years. The collection and storage of genetic resources was largely a national effort or related to a specific breeding or crop improvement program. In the 1960s it became apparent that a more organized international effort was required.

The International Program

The International Board for Plant Genetic Resources (IBPGR) was established in 1974. It is sponsored by the Consultative Group on International Agricultural Research (CGIAR) which also sponsors the international agricultural research centres. The secretariat of the IBPGR is supplied by the Food and Agricultural Organization (FAO) of the United Nations. The IBPGR has a mandate to ensure that the genetic resources of crop plants are collected and conserved in gene banks and thereby made available for use by plant breeders and other scientists. It is largely involved with collection and conservation of land races and wild species. The IBPGR is an apolitical organization involved



Figure 1. Each of the world's major food crops originated in a relatively confined geographic area. The numbers on the map refer to areas which are considered to be centres of origin and diversity for one or more species. Due to changing cropping practices, these reservoirs of genetic diversity are disappearing.

in all areas of the world and facilitating the exchange of genetic resources among all nations regardless of their political ideologies.

Initially the IBPGR gave priority to the collection and preservation of land races of crops which were the most important and at the greatest risk in terms of replacement by new cultivars. In a little more than a decade of existence the IBPGR has stimulated the development of national and regional institutional capabilities and the extensive collection of germ plasm (the genes available for the improvement of a crop) of priority crops in priority regions. Priorities have now been revised to include a wider range of crops, and more emphasis has been placed on collecting relatives of our crop species. A network of base centres for seed crops has been established and, for the more important crops, collections are often duplicated in different countries. Canada maintains base collections of cultivated and wild 1) millet; 2) oats; 3) barley, and 4) oilseed and green manure crucifers (for example, rapeseed and mustard).

It is expected that within the next 10 years IBPGR will have completed its role of stimulating the collection and preservation of genetic resources. This organization will likely become much more active in the evaluation of the large collections that have been made. In addition IBPGR has become very involved in funding research projects involving germ plasm preservation and utilization. One of the recent priorities in research has been the preservation of germ plasm of crops, such as potatoes and some fruit species, that will not breed true if maintained by seed. In this case vegetative material must be stored, which is considerably more difficult than storing dry seed. Considerable progress has been made in the development of long-term, low temperature preservation techniques for these materials.

The Canadian Program

The Plant Gene Resources of Canada (PGRC) was set up in 1970 to obtain, exchange, preserve, document, and evaluate

germ plasm of crop plants and their relatives. The Expert Committee on Plant Gene Resources, with membership from government, universities, industry, and scientific societies, advises PGRC on policies. Dr. H.R. Klinck of the Plant Science Department at Macdonald College was a long time member of the Expert Committee, while the author of this article is currently representing the Canadian Society of Agronomy on this committee.

The central office of PGRC is located on the Central Experimental Farm in Ottawa and is under the administration of Agriculture Canada's Plant Research Centre. The Central Office is staffed by a professional biologist, Dr. Brad Fraleigh, and three technicians. Over 80,000 samples of seed are preserved by PGRC. In addition to the four world base collections mentioned above, the Central Office also has: The CN collection of 18,000 samples of wheat, barley, oats, tomato and alfalfa; The PGR collection of 19,000 samples of various crop species; The Canadian *Avena* collection of 7,400 samples of wild oats; the Canadian *Hordeum* collection of 2,700 wild barleys; and duplicate samples of the United States Department of Agriculture barley, oat and flax collections. PGRC also established, and now monitors, the National Apple Repository which preserves about 200 apple clones at various Agriculture Canada Stations. This may be extended to other clonally propagated crops in the future.

Most of the seed stocks are either in long term (-20° C) or midterm storage (4° C at 20 per cent R.H.). Plants are regularly grown out when seed stocks are low or viability declines. This is done in cooperation with Canadian plant breeders. Germ plasm is actively distributed and exchanged with breeders and institutions. Between 1983 and 1986, for example, over 11,000 samples were sent to, and over 2,000 received from, other countries. Exchanges within Canada were of the same magnitude. There are several examples of recently developed cultivars that have characteristics obtained from material stored at PGRC.

We have a good genetic resource program in Canada, but it is somewhat modest considering the wealth of our country and the importance of agriculture to our economy. Although a strong plant gene resources program is vital to the long term stability of our agriculture, it has a relatively low political profile. The PGRC Central Office requires more professional personnel, expanded storage facilities, and an improved data handling system. We are hopeful that this program can be expanded in the near future.

Controversy

The recent activities in collecting and preserving our plant genetic resources have not been without controversy and criticism. The first criticism centres around an alleged exploitation of gene-rich (generally the developing) countries by gene-poor (usually the developed) nations. It has been pointed out that genetic material is being taken, for free, from Third World countries. Genes from this material are incorporated into new cultivars and then it is said that the developed countries are reluctant to return this germ plasm to the developing nations unless a profit is realized. There is very little evidence to support this as records from gene banks indicate a free flow of germ plasm between all countries of the world. Even in those countries that have Plant Breeders' Rights legislation, the genes of improved cultivars can be used in any other breeding program in any country at no cost.

It has also been suggested that the IBPGR supports this exploitation of the gene-rich countries. However, if one looks carefully at the record of this organization, one finds that projects have been supported in all nations of the world. In the very important area of the establishment of storage facilities, 80 per cent of the facilities receiving IBPGR support have been in developing countries. Any suggestion that IBPGR wants most of the world's germ plasm stored in industrialized nations cannot be supported. There is no question that IBPGR receives most of its

Continued on page 16

Plant Breeders' Rights for Cultivar Protection

by Professor H.R. Klinck

Department of Plant Science



The author inspecting his new oat cultivar Baldwin at the Lods Research Centre.

The Universal Declaration of Human Rights adopted by the United Nations Organization in 1948 states: "Everyone has the right to protection of the moral and material interest resulting from any scientific and technological development in Canadian agriculture through the Patent Act and other means of ensuring proprietary rights has been highly beneficial. However, such protection has not been available in Canada for new crop cultivars (varieties) developed by plant breeders. There is little opportunity under present Canadian laws for the breeder to recover developmental costs.

The concept of cultivar protection is not new. During the late 1800s rights were granted in certain European countries under existing patent laws. Similar legislation was enacted in the United States in 1930. These applied primarily to asexually reproduced cultivars. Attempts to introduce such legislation in Canada in 1950, however, were unsuccessful.

Beginning in the 1930s plant breeders' rights legislation evolved in western Europe to protect both sexually and asexually reproduced cultivars. In 1938 plant breeders from France, Germany, The Netherlands, and Denmark created the "International Association of Plant Breeders for Plant Variety Protection" (ASSINSEL). In 1961 representatives from these countries, along with those from Belgium, Switzerland, Italy, and the United Kingdom, created the "International Union for the Protection of New Varieties of Plants" (UPOV). The United Kingdom and South Africa enacted plant variety protection legislation in 1964. In 1970 the United States adopted the Plant Variety Protection Act. Since that time several other countries have introduced similar legislation. UPOV now comprises 17 member countries.

Canada was not oblivious to these developments. In 1956 a Royal Commission on Patent, Copyright, and Design rejected the use of the Patent Act for plant variety protec-

tion. A review of the subject in 1966 by a Department of Agriculture committee resulted in a recommendation against legislation for plant variety protection because of potential seed trade problems with the United States, which had no applicable rights legislation at the time.

The subject was re-opened for serious consideration at a conference held in Guelph in 1971. The principle of such legislation was endorsed by the Canadian Agricultural Services Coordinating Committee (CASCC) in 1972, and Agriculture Canada was encouraged to prepare the necessary bill. The merits of plant breeders' rights were discussed widely in such organizations as the Canadian Seed Trade Association, the Canadian Seed Growers' Association, the Canada Grains Council, the Canadian Expert Committees on Grain Breeding, the Canadian Ornamental Plants Foundation, and the Agricultural Institute of Canada. Members of these groups are involved in some aspect of plant breeding, seed or crop production, or seed marketing. All of them have gone on record as supporting the principle of plant breeders' rights legislation. Some producer organizations and others, however, expressed serious reservations about such a program and its effects on Canadian agriculture. In preparing a draft bill Agriculture Canada sought opinions from these groups and from other sources.

In 1980, Bill C-32, the Plant Breeders' Rights Act, was introduced in the House of Commons and given first reading on May 29. However, parliament dissolved before further action could be taken and the process was put on hold. Active discussions in various organizations were resumed in 1985, culminating in the preparation of an up-dated draft bill. Plans are to have this presented to the House of Commons at the 1987 fall session. It is only after this that the details of the proposal can be released.

For close to 100 years the Canadian government has maintained in-house plant breeding programs. Similar programs have been conducted by agricultural faculties of universi-

ties with financial assistance from government or industry sources. These programs have been extremely successful, providing a succession of improved cultivars of many crop species for Canadian agriculture, keeping it competitive with that of other countries. Traditionally, seed of new cultivars was released for anyone to propagate and market with a minimum of constraints and little or no expectation of direct financial benefit to the breeder or his institution. To some extent this was resolved by the creation of the SeCan Association in 1976. Members of SeCan multiply seed of new cultivars from public breeding institutions in Canada under contract, and provisions are made for the collection of royalties on sales of Certified seed. While the system has helped a number of university-based plant breeding programs, to date, royalties have not been collected on federal government cultivars.

Much more effort is needed to provide improved cultivars for Canadian producers, either through expanded breeding programs

or by the introduction of cultivars from other countries. There appears to be little hope of expansion within the public sector. The alternative, then, is to encourage the private sector to participate.

During the past 20 years a number of private seed merchandizing firms, many of them already well established in corn breeding, have shown an interest in developing breeding programs for other crops and have been given government financial assistance to launch such programs. In addition, several private companies have initiated programs with a view to developing improved crop cultivars using new biotechnology techniques. If the private sector is to recoup its cultivar development costs, a system is needed whereby it can retain legal possession of its material and have a legal basis for receiving compensation for the use of its cultivars by others. This is a type of patent protection that could be realized through plant breeders' rights, with provision for the collection of royalties on seed sales. The

primary effect of plant breeders' rights in countries that have had rights programs for some years has been to stimulate the private sector to set up plant breeding enterprises. These have supplemented, not reduced, the public breeding efforts. If plant breeders' rights legislation was enacted in Canada, it would provide legal protection for both privately and publicly developed cultivars.

At the present time plant breeders in countries having cultivar protection are reluctant to release their cultivars for production in Canada because no legal mechanism exists here to ensure the collection of royalties. Plant breeders' rights legislation in Canada would facilitate reciprocal arrangements with other countries having breeders' rights, to the benefit of both. It could be particularly important for those crops where small acreages do not justify a plant breeding program in Canada.

Enactment of plant breeders' rights legislation would not necessarily permit the wholesale importation and distribution of foreign cultivars. Nor would it allow the development and sale of inferior Canadian cultivars. Any proposed new cultivar must be shown to have an advantage over those currently available in at least one agricultural region before registration is granted under the Canada Seeds Act, permitting its release for commercial production and sale. As long as this system is retained, the likelihood of inferior cultivars being released for commercial production is very remote.

While the details of the proposed legislation are not public information at this time, a number of considerations and concerns have been brought to the attention of those responsible for drafting the legislation. On the basis of previous discussions it is anticipated that the Act will include the following provisions. The breeder of a new, distinct, uniform, and stable cultivar will be granted the exclusive right to multiply and sell reproductive material of the cultivar, and others wishing to multiply and sell it will be subject to conditions set by the breeder, including the payment of royalties. A protected cultivar will be



A great deal of time and effort goes into plant breeding and breeders' rights would protect that investment.

freely available to others for breeding purposes. Protection of a cultivar will be voluntary. Protection will be granted for a limited period, probably 18 years. Enforcement of rights will be the responsibility of the breeder through civil courts. A broadly representative advisory committee will be established to advise on administration of the legislation.

Concerns have been expressed that the enactment of plant breeders' rights would reduce government involvement in plant breeding. While this is possible, it has been stated that one of the major objectives of the proposed legislation is to stimulate an overall increase in plant breeding in Canada. It has been pointed out, too, that breeders must work closely with plant physiologists, plant pathologists, agronomists, and others in the development of improved cultivars. Such teams are not always available in private industry, imposing some limitations to the impact of private breeding enterprises on the overall plant breeding effort in Canada. There is concern, too, that a reduced number of public sector (including university) breeders would adversely affect the training of graduate students in plant breeding.

Some are of the opinion that competition among private breeders and between private and public breeders may inhibit the exchange of germplasm. Proponents of breeders' rights do not consider this a major problem since such germplasm would become public once the new cultivar is released; its availability would only be delayed.

It is expected that an effect of plant breeders' rights legislation would be an increased use of pedigreed seed. With the opportunity to collect royalties the price of seed may rise. Seed costs, however, represent a small proportion of production inputs and could be more than offset by the use of superior new cultivars as has been experienced with hybrid corn. Furthermore, in a competitive system, increases in seed costs should be minimized.

It should be clear within the next few months whether or not plant breeders' rights in Canada will finally become a reality. There is a strong body of opinion in favour of such legislation, but considerable opposition has

also been expressed. Undoubtedly the proposal will be the subject of considerable debate, despite the fact that the principle is in keeping with the United Nations Universal Declaration of Human Rights.

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Searching for Elusive Perfection

by Serge Lussier

Lecturer, Department of Plant Science
and Assistant Director, Diploma in Agriculture Program

There is an old French proverb that says "Vingt fois sur le métier remettez votre ouvrage." The person who first wrote this must have been a plant breeder. The goal is to find that new genetic combination that will provide the grower with better results and this is long, tedious work where one toils hard for elusive results.

Long before Gregor Mendel discovered the laws of heredity in the last century, farmers were using crop improvement. This is how wild plants became cultivated ones. Simple selection of the best looking plants continuously over long periods can be a very powerful improvement tool indeed. What Mendel did, however, was open the door to directed breeding, where new gene mixtures are created by carefully choosing the parents.

The breeding method used to effect this genetic reorganization differs according to species. In cereals female flowers are emasculated by hand and pollen is brought in from the stamens of the other parent. This is a slow, delicate process requiring well-trained hands. The number of crosses is, therefore, limited by available manpower. Much care must be taken in choosing the parents in order to maximize the chances of success. The main thrust of the breeding effort is directed towards yield, diseases, lodging, and quality.

Hybridization is only the first step in the process. A period of segregation and selection follows. The advent of biotechnology has brought about a minor revolution in cereal improvement. Techniques are now available to shorten the segregation period from six or seven years to only one. The doubled haploid and anther culture procedures both permit the restoration of normal plants with two identical sets of chromosomes (homozygous) from a parent plant or plant part with only one set of chromosomes (haploid). This time compression entails a major reduction in the space and hours of work required to get lines ready for testing. It also allows a faster reaction should a sudden problem (disease or insect) affect the crop. Final selection is carried out only on the homozygous plants.



Breeding cereals is a delicate, time-consuming operation.

With the conventional system, the best looking plants are kept each year and sown to yield plants that are again subjected to heavy selection pressure. In this way, lines are formed and the lineage of a cultivar (variety) can be traced back to see how it resembles its parents.

In both cases, conventional or biotechnological, the lines that survive a final purge are placed in observational tests. Macdonald College places 250 lines per year in these tests for both oats and barley. They are compared to the best available cultivars. This cuts down drastically on the number of lines that make it to the next step. In Quebec observational tests are only conducted at the originating station. Subsequent testing levels are carried out at an increasing number of sites in the province to determine the adaptability of the lines to different environments.

The culmination of this testing blitz is the cooperative series. The original 250 lines per year are now down to three. The Eastern Cooperative Yield Tests are carried out in

Ontario, Quebec, and the Maritimes. They compare lines from many separate breeding programs to see which are worth marketing. A breeding program only gets one cultivar to market every few years.

Forage improvement differs from cereal work in many important ways. Perennial forage cultivars are not pure lines but mixtures of similar types called synthetics.

Synthetics can be produced by the random interbreeding of suitable plants. As most perennial forages are cross-pollinated, hand breeding is usually not required. Wind and insects are well suited for this work. The parent plants are chosen for their longevity, yield, and resistance to various diseases.

Once seed is obtained, the synthetic variety is included in preliminary and cooperative trials that compare it to commonly grown checks. This part of the work is quite lengthy because of the establishment period required. No yields are taken during the seeding year to simulate farm conditions. As the breeder is



Forages are still grown on a larger area than any other crop in Quebec.

not looking for pure lines, no segregation time is required between crossing and testing. This counterbalances the extra testing years and permits the release of new cultivars in reasonable time.

The corn plant has a flower structure that is very different from either cereals or forage plants. Female flowers are found on the cob and male flowers in the tassel. This separation of duties and the location of the tassel at the very top of the plant have made hybrid seed production a routine operation. All field corn cultivars currently marketed are first or second generation hybrids.

In producing new cultivars, the breeder first searches for the desired characteristics

among the thousands of inbred lines available. It is then a simple task to pollinate the female inbred with pollen from another line. The resulting hybrid can be tested immediately; no segregation time is needed. Because of the rapidity of this system, large numbers of crosses can be looked at every year. Even if the success rate is relatively low, the size of the breeding programs involved ensure a steady stream of new cultivars.

Since new cultivars are better than current ones by definition, the turnover rate for corn is very quick. The time requirement from breeding to registration can be as short as four years, followed by a useful commercial life of about five years. This constant efferves-

cence stems from another aspect particular to corn improvement; almost all cultivars are produced and marketed by private companies. This is in marked contrast to the heavy involvement of public and semi-public institutions in cereals and forages. The enthusiasm of private breeders in corn is due to the high level of control that companies can exert over seed production.

The breeding, selecting, and testing process is only the first step in the eventual release of any new cultivar. The results of the last series of tests performed are used in the registration process. Each new line presented is evaluated by an expert committee to ensure that it is better in some significant way than existing cultivars. The improvement can be in yield,

disease resistance, or concern other agronomic characteristics. In some species, wheat in particular, quality is all important. Canada has staked its international reputation on the quality of its cereal exports and this has become critical in the face of the current grain war.

Agriculture Canada has recently accepted the principle of regional registration, where a cultivar could be grown and sold only in certain provinces. Each region has been given its own expert committee to review applications on the basis of local needs. The Eastern Expert Committee on Cereals and Oilseeds covers Ontario, Quebec, and the Maritimes. It is hoped that this change will speed up and streamline the whole procedure.

Once a cultivar is registered, it can be multiplied and sold and its name is legally protected. Unfortunately, the protection ends there. Anybody can produce seed of this cultivar and sell it as long as no name is used or inferred. Unlike many other industrialized countries, Canada has no plant breeders' rights legislation. Such laws identify the breeder as the owner of the cultivar; he holds a patent on a specific genetic entity. As with any patent, the breeder can license others to multiply this cultivar. This ensures a just reward for the efforts of those involved in crop improvement.

Plant breeders' rights legislation has received first reading in parliament many times over the past decade. On each occasion, it has died on the order paper because of the controversy it generated. Private ownership of genetic information is a touchy issue, but a closer analysis reveals some major advantages.

Under the present system, many useful cultivars are kept out of the country because foreign breeders fear that these will be pirated once they get to Canada. For the same reason, Canadian seed companies are reluctant to get involved in the improvement of those species that breed true, especially cereals. With their good financial backing, private breeding

programs could be as productive in cereals and forages as they are in corn.

Under the proposed legislation, new cultivars would continue to be merit tested under government supervision. This should alleviate the fear expressed by many people that private companies would start marketing cultivars that require the use of special pesticides or fertilizers. The influx of new cultivars would also prevent seed prices from rising. The best example of that is corn, where all cultivars are privately owned and seed prices on an hectare basis are the same as for cereals, despite the latter's lower yielding ability.

Finally, concerns have also been voiced over the possible reduction in the free movement of genetic material between commercial breeders. A lively exchange is already at

work between current breeding programs, and this is not likely to change. Breeders recognize the need for the exchange of new material to keep their improvement programs going.

It is unfortunate that a few ill-informed persons have managed to stall a piece of legislation that would bring a breath of fresh air to plant breeding.

Macdonald College would be one of the beneficiaries of plant breeders' rights. There is a long, illustrious history of crop improvement at this institution. No fewer than 32 cultivars have been released in species as diverse as rhubarb, timothy, and barley. The continuation of this work requires new sources of funding and royalties from seed production would be more than welcomed.



Mr. Norman Thogersen, right, Business Manager, Forest Products, CIL Inc., with Dr. Kenneth Frey, CIL Distinguished Visiting Lecturer, and Dr. H. R. Klinck, Chairman of the Department of Plant Science. Dr. Kenneth Frey, is the C.F. Curtis Distinguished Professor in Agronomy at Iowa State University of Science and Technology, Ames, Iowa. Dr. Frey, whose visit was sponsored by CIL under their 1987 Distinguished Visiting Lectureship program, spent eight days in the Department of Plant Science in September. A world-renowned plant breeder with broad interests and experience, Dr. Frey gave a public lecture at Macdonald and at the downtown campus of McGill on "The Plant Breeding Contribution to Feeding People," and a seminar on "High Yield and High Protein Content - Can Cereals Provide Both?"

Biotechnology in Crop Improvement

by Professors B.E. Coulman and W.F. Grant

Department of Plant Science

Biotechnology has had an impact in several areas including animal improvement, food processing, and the pharmaceutical industry. It has also played a role in plant improvement, and it is expected that this role will become more significant in the future. There are a number of techniques which are usually considered to fall under the title of plant biotechnology. Although we normally think of biotechnology as referring to recently developed biological techniques, some of the methodologies in plant biotechnology have been around for many years. These techniques are often referred to as *in vitro* crop breeding.

Biotechnology is, or may potentially be, used in crop breeding to: a) expand the genetic base of important crops through transfer of genes from other species, or possibly by the creation of new genes; b) speed up the development of new cultivars through the rapid achievement of homozygosity after a cross, and c) preserve vegetative germplasm for long periods of time.

Callus and Cell Cultures

Callus cultures are masses of undifferentiated cells derived from plant tissue growing on a nutrient medium. Cell cultures can be prepared by suspending callus in liquid medium and shaking or rotating to break up the callus. With many plant species, addition of certain hormones to the medium will lead to the production of roots and shoots from the callus. Thus, mature plants can be regenerated from this undifferentiated tissue.

Plants differentiated from callus are often different from the original plant from which the callus was produced. Changes take place in cells of callus or suspension cultures, and these changes may be due to genetic causes and thus can be passed to subsequent generations. Plants regenerated from callus are known as somaclones and the variation that occurs is known as somaclonal variation. The reasons for its occurrence are not well understood.

The plant breeder can screen these somac-

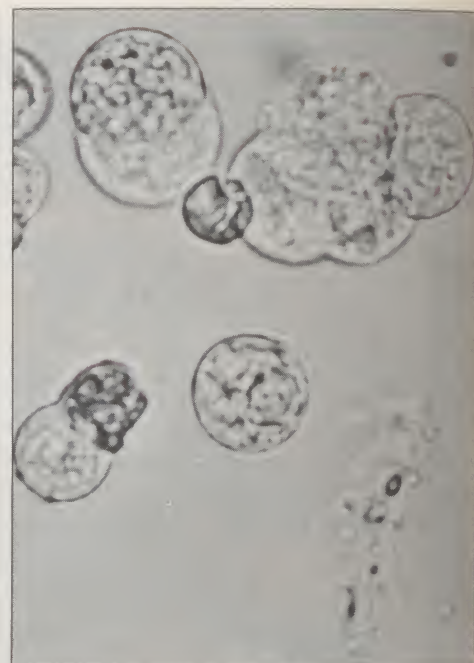


Anthers of birdsfoot trefoil being cultured for the induction of haploid plants (right). The development of callus from the anthers and the initiation of roots through reduced cytokinin (left).

lones for desirable variants. This screening may be done among regenerated plants or may be carried out in callus or suspension cultures by introducing a selective agent into the medium. Many thousands of individuals can be screened in a small culture vessel of calli or cells; however, the desirable traits selected for at the cellular level must be expressed in the regenerated plant, and this is not always the case. Selection among somaclonal variants has produced disease resistant sugarcane and saline soil tolerant flax, to name a few examples. Research in the Department of Plant Science at Macdonald College is currently being done to select disease resistant red clover and herbicide tolerant birdsfoot trefoil from somaclonal variants.

Anther and Pollen Culture

It is possible in an increasing number of species to produce haploid plants through the culture of anthers or pollen. Haploids have only one half of the normal number of chro-



Fused protoplasts of rice (dark cells) and soybean.

mosomes. The chromosome numbers of these haploids can be doubled back to the normal number using certain chemicals. This produces plants that are completely homozygous; in other words, both sets of chromosomes have the same genes.

When a plant breeder makes a cross in crops such as wheat, oats or soybeans, the progenies must be grown out for about six generations until they are genetically uniform enough (i.e. almost homozygous) to test and select for characters such as yield. Using anther culture of the progeny plants of a cross, one can achieve immediate homozygosity, thus reducing from three to six years the time required to produce new cultivars. This method has been successfully used to produce superior breeding lines in tobacco and its use is now being investigated in several other crop species.

Embryo Culture

Embryo culture is a procedure by which an

embryo is excised from a developing seed a few days after fertilization and placed on a nutrient medium to produce a seedling plant. This technique has made it possible to make crosses between plants within related species or genera. Seeds are not usually obtained when many of these interspecific crosses are done, due to the lack of development of the endosperm which nourishes the growing embryo. With embryo culture, the embryos are nourished by the nutrients in the medium. Wheat and barley are examples of species which have been crossed using embryo culture.

In our own laboratories we have been trying to improve the forage legume birdsfoot trefoil by introducing desirable characteristics from related species found growing wild in Europe and Asia. We have made crosses between these wild species and have been successful in culturing the embryos and bringing the hybrids to maturity. We subsequently crossed these hybrid plants to birdsfoot trefoil and obtained new hybrid

plants through embryo culture. Without the use of embryo culture, none of the crosses would have produced progeny.

Protoplast Culture and Fusion

Protoplasts are "naked" plant cells that have had their rigid cell walls enzymatically removed. With the wall removed it is possible to bring about the fusion of these cells or protoplasts. If the protoplasts of two different species are incubated together, fused protoplasts would carry the genetic material of both species. Plants regenerated from these fused protoplasts would be hybrids between species which may not have been able to be successfully crossed by standard techniques. This is referred to as somatic hybridization as opposed to the normal sexual hybridization.

The protoplasts of a large number of different species have been fused; however, by the time the hybrid plants have been regenerated, the chromosomes of one of the species have

usually been lost. Thus the plants are not truly hybrid, but are identical to one of the parent species. There are examples of species being successfully hybridized somatically, but these have been between species that can be sexually crossed by standard procedures. In our own laboratories in order to create some interesting new interspecific hybrids of *Impatiens* species, we are developing procedures for protoplast isolation and fusion specifically created for *Impatiens* production.

In general, protoplast fusion has not been as successful as many scientists had hoped; however, work is continuing to improve these techniques.

Molecular Approaches to Plant Improvement

The most recently developed plant biotechnology techniques are those that involve the use of recombinant DNA. These are the techniques which will likely have the greatest impact on plant improvement in the future. The techniques described above have involved random alteration of the genetic material of a plant or random recombinations of the genetic material of two species. If specific genes or sequences of DNA could be isolated, perhaps altered, and then transferred to a target species, improvements would be much more directed. Recombinant DNA techniques are often referred to as "genetic engineering."

Recombinant DNA technology is based upon the ability to fractionate and then join fragments of DNA from different sources. This DNA, containing a gene or genes of interest, is then introduced into a host cell where it is incorporated into that cell's genetic material. The most common way that DNA carrying a gene of interest is incorporated into a host cell is through the use of a vector. A vector must be capable of entering plant cells and incorporating its genetic material into that of the plant. The DNA fragment to transfer is spliced to the vector's DNA and then the host cells are infected with the vector. A common vector used for this



Somaclonal variation in red clover plants regenerated from callus. Plants on the left and right are unifoliate, while the centre plant shows the usual trifoliate leaves.

work has been a plasmid (a free DNA sequence) of *Agrobacterium tumefaciens* which causes crown gall in many plant species. Plant cells are infected with this bacterium carrying the gene(s) of interest and plants are regenerated by the methods mentioned above to check for the expression of the gene(s). At present, genes have been transferred in tobacco, petunia, carrot and potato, to name a few. In our own laboratories we are hoping to use these techniques to attempt to transfer genes for herbicide tolerance and resistance to pod shattering in birdsfoot trefoil.

This technology is still in its infancy. There are many problems to be worked out before it will be routinely used in crop improvement programs. Even so, most scientists feel that molecular techniques will play a significant role in crop improvement programs in the near future.

Summary and Conclusions

There are several techniques, classified as plant biotechnology, which have been used in crop improvement. These techniques have not replaced, and will not replace, traditional plant breeding programs, rather they will complement them. Plant biotechnology techniques will increase the genetic variation on which the plant breeder will carry out selections. The molecular techniques, in particular, offer the potential of developing novel characteristics for our crop plants. Whatever the improvements, however, extensive field evaluation and testing must still be carried out to insure that the producer will have well adapted, productive cultivars.

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Once a year, in print, we would like to take the opportunity to say a very special thank you to those people and organizations who, apart from our regular supporters, have shown their encouragement and support through a financial contribution to The Macdonald Journal.

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Continued from page 7

funding from the industrialized nations; however, these are the only nations with the resources to fund such a program. If these nations didn't provide this support, IBPGR would not exist, and our plant gene resources would be in a sorry state.

Another criticism centres around whether genetic resources should be conserved in seed banks. It has been suggested that a selection is taking place for ability to survive under such conditions and that much genetic variability is being lost. Research data indicate that under the correct conditions many seeds can be stored for 50 years, and possibly much longer, with no loss of viability. For

seeds that are not as long lived, growing out plants and producing fresh seed will minimize selection. The key here is that funds must be available to establish and maintain proper storage facilities and to support a program of regeneration. Critics of gene banks suggest that land varieties could be kept in "farm reserves" in their area of origin. Considering the number of lines now held in gene banks, this method would require a large amount of land, which many developing nations desperately need for food production, using improved cultivars.

Clearly we must maintain the recent international activities for the collection and preservation of our plant genetic resources. Our survival may depend on it.

Mycorrhizal Fungi and the Transfer of Nitrogen from Legumes to Grasses

by Professor D.L. Smith

Department of Plant Science

Many of the other lead articles in this issue deal with genetics and crop improvement. When yields increase, the root system is put to a critical test. Will it provide enough nutrients for the rest of the plant? Some fungi can form a close association with plant roots and help them maintain adequate levels of all nutrients, particularly phosphorus.

The roots of almost all crop plants are involved in a symbiotic relationship with mycorrhizal fungi which are found in almost all soils. The infection of roots by these fungi results in greatly improved nutrient absorption by the plant, particularly of nutrients that have low mobility in soil. Of the three macroelements: nitrogen, potassium, and phosphorus, the latter is easily the least mobile. As roots grow into the soil, the phosphorus immediately adjacent to the root diffuses toward the root surface and is taken into the plant. But the rate of movement toward the root is very slow and phosphate molecules (the most common form of phosphorus in soils) more than a few millimeters from the root surface will not reach the root during its lifetime and, therefore, are not taken up by the plant.

Fine strands of fungi (hyphae), many times thinner than roots, grow outward from the surface of mycorrhizal roots and ramify throughout the soil as much as 1 dm from the root surface. These hyphae take up soil phosphate and conduct it back to the root, greatly increasing the amount of phosphate that a plant can absorb. Many other nutrients are also conducted to the host plant roots by mycorrhizal fungi. However, as these elements are generally more soil mobile or are required in smaller amounts than phosphorus, or both, the greatest benefit of mycorrhizal infection is usually in the supply of phosphorus. In exchange for this increased nutrient availability the crop plant provides sugars to the fungus. Some recent experimental work at Macdonald College and at the Ste. Foy Agriculture Canada Research Station suggests that the CVPQ phosphorus fertilizer recommendations assume mycorrhizal infection of the crop under consideration.



This photo shows corn interplanted with soybeans having received the recommended amount of phosphorus but growing in sterilized soil.

The crops of the legume family are able to form a second type of root symbiosis. The roots of these plants become infected by certain soil bacteria. The infection results in characteristic bumps on the root, called nodules. The bacteria are contained inside the nodules where they, like the mycorrhizal fungi, are supplied with sugars produced by the plant. In exchange for the sugars, the bacteria utilize an enzyme possessed only by a few bacteria and convert atmospheric nitrogen into forms of nitrogen that the plant can use. It should be noted that 80 per cent of the atmosphere is nitrogen in the form of N_2 . Without the aid of nitrogen fixing bacteria, this form cannot be used by plants. Indeed, this atmospheric N_2 is used, along with large quantities of natural gas, to make the nitrogen fertilizer applied on farms.

While the legumes (soybeans, alfalfa, trefoil, clover, peas, field beans, etc.) have root nodules that can fix nitrogen, other crop plants do not. Recent research has indicated that when legumes are grown together with grasses, as in forage swards of alfalfa and



This photo again shows corn interplanted with soybeans, this time without phosphorus but colonized by a mycorrhizal fungus.

timothy, or as can occur further south in soybean-corn intercrops, some of the nitrogen fixed by the legumes makes its way to the grass. The method for this nitrogen transfer is not known. Recent research has shown, however, that the hyphae of mycorrhizal fungi may grow out of one root and, upon encountering the surface of an adjacent root, infect it. The second root can be that of a different plant, or even a plant of a different crop. This results in tiny biological pipes connecting the roots of two plants. It has been shown that phosphorus, taken from the soil by one of the connected plants can be transferred to the other, apparently through the mycorrhizal-fungal hyphae. Indeed, it has been demonstrated that certain non photosynthetic, parasitic plants, such as the rare Indian pipe, use such fungal connections between their roots and those of the parasitized plants to bleed sugars from the host, allowing for the growth of the parasitic plant.

In Quebec large areas of mixed forage legumes and grasses are grown. Maintaining a good mixture of grass and legume is some-

times a difficult task. At very low nitrogen fertilizer levels, the grass grows very poorly, and may be overgrown by the legume. At high nitrogen fertilizer levels, the reverse occurs. It is desirable to have the legume because of its high protein content and its nitrogen fixing abilities. The grass is desirable because of its high productivity. If it could be demonstrated that some of the nitrogen that is transferred from legumes to associated grasses moves through mycorrhizal-fungal hyphae, and that this either is or could be made the major route of this nitrogen transfer, management techniques, such as inoculation with selected mycorrhizal fungi, or utilizing the optimum combination of legume, grass and fungus, might allow production of mixed legume-grass forage swards where the two components were maintained in a good balance and the grass grew without the need for fertilizer nitrogen.

Research at Macdonald college by the author, his graduate student, Chantal Hamel, and technician, Joan Kearval, in cooperation with Dr. V. Furlan of the Agriculture Canada Ste. Foy Research Station, has now provided evidence that mycorrhizal fungi assist in the transfer of legume fixed nitrogen to associated grasses. Timothy plants grown in pots with alfalfa and infected with mycorrhizal fungi contained a higher percentage of nitrogen than those in pots with alfalfa but without mycorrhizal fungi. In preliminary experiments the use of radioactive nitrogen has allowed the detection, in only a few hours, of the movement of low levels of biologically fixed nitrogen from soybean root nodules into the roots of associated grass plants. Other indoor experiments are being conducted to examine the effect on different species of forage grasses and, eventually, different fungi and legumes will be tested. In addition a field experiment conducted on a chemically sterilized soil site is about to be concluded. In this experiment corn and soybean plants were grown together and either mycorrhizally infected or not. In addition the soybeans were either the normal nitrogen fixing type or a mutant that is unable to fix nitrogen. Higher nitrogen content in the mycorrhizal than in the non mycorrhizal corn

will provide an indication of a role of mycorrhizal fungi in the transfer. The level of transfer in the field, the effect of inoculation, specific fungus, legume grass combinations, and a host of other management and environmental factors have yet to be tested.

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Issues in Human Nutrition

Answering the Body's Needs



Shirley Mae Weber retired in August as a Professor in the School of Dietetics and Human Nutrition. Professor Weber is a former Director

of the School of Food Science and taught nutrition courses in the School and in the Continuing Education program at McGill. Professor Weber now holds a part-time, post-retirement appointment in the Faculty of Education where she is involved in a research project on the development of software for the teaching of basic nutrition.

What is a low nutrient density food?

What better way to respond to the question than with a definition! Nutrient density is a measure of nutrients provided per calorie of food.¹ The kinds and amounts of nutrients present in a food relative to its caloric value establish its nutrient density.

The use of the term low nutrient density to describe a food implies that the particular item does not make a significant contribution to the body's nutrient needs. An example of a food at the bottom of the scale of nutrient density might be a sugar-sweetened, artificially-flavoured drink. An 8-ounce serving of such a drink supplies approximately 110 calories, but no other nutrients are provided. An 8-ounce serving of skim milk supplies the same number of calories as well as significant amounts of several nutrients and, therefore, may be described as a high nutrient density food. Vitamins and minerals could be added to the drink and thus improve its nutrient density. However, nutritionists are divided in opinion on the value of such a practice.

Foods with a high nutrient density are especially useful in calorie-controlled diets when one wants the best nutrient return for the number of calories invested. Calorie-controlled diets are usually chosen by the weight conscious, but are also found among groups

who have limited their food intakes for other health, social, or economic reasons. Nutrients per calorie are a very important consideration for these people. For example, in terms of iron, which has the highest nutrient density: sirloin steak or sardines? In a 3-ounce serving, both contribute 2.5 mg of iron. However, the serving of steak provides about 330 calories and the sardines about 175 calories. Therefore, in terms of nutrient density for iron, sardines are the better choice.

The concept of nutrient density can be translated into a formula which gives the Index of Nutrient Quality (INQ) of a food. Using the INQ, one can make observations about the "nutritious" quality of a food. A detailed discussion of the INQ and how the concept may be used in nutrient labelling must await another issue.

The media have been reporting the importance of adding fish oil to the diet as a means of preventing heart disease. Adding fat to the diet! Aren't low fat diets recommended?

Let me respond to the question in two parts: (1) the relationship of fat (including oils) to coronary heart disease (CHD) and (2) the role of fish oil - or more precisely, a particular type of fatty acid found in fish - and CHD.

Over the past 35 years, there have been literally thousands of studies which have investigated the relationship between the kind and amount of fat in the diet and the incidence of CHD in population groups. During that time, nutritionists have learned a great deal about the composition of fats and the public has gained some familiarity with such words as cholesterol, triglycerides, lipoproteins, and polyunsaturated fatty acids. One message from all this research which has the support of various government and health groups is that our diets have been too high in fat and that only 30 per cent of our daily caloric intake should be derived from fat. So, in answer to your question - yes, low fat diets are recommended.

Now to the question of fish oils and the long chain omega-3 polyunsaturated fatty acids

they contain. Early interest in the role of fish in the diet and cardiovascular disease was sparked by studies among populations whose diets were principally animal fat from fish, seal, walrus, and whale. It is still not clear what role the fatty acids found in fish play in the health of the normal population, but the omega-3 polyunsaturated fatty acids have been effective in lowering the serum triglyceride levels of those individuals in the population who have hypertriglyceridemia.² Until further studies are completed, it is best to leave the fish oils in the hands of the scientists and get our omega-3 fatty acids from salmon, trout, tuna, mackerel, and whitefish.

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Notable Events

Macdonald Hosts International Mastitis Symposium



Moderator Dr. James Booth of the Milk Marketing Board of England and Wales with, l to r, Drs. Frank Dodd, UK, Ken Leslie, Canada, and Pete White, USA.



The symposium attracted about 300 people from 24 countries.

On August 14-15, 1987, Macdonald College played host to an International Mastitis Symposium held in conjunction with the XXIII World Veterinary Congress. Organized by the Canadian Committee for Mastitis Control and Prevention, the meeting attracted 300 registrants representing 24 countries.

Theme topics for the two-day event included "The Milking Machine and Mastitis" and "Mastitis Therapy - Principles and Practice." In addition to contributed poster presentations, invited speakers from England, Ireland, Denmark, Germany, Israel, Australia, New Zealand, the United States, and Canada presented data resulting in an outstanding program.

Dr. J. Murray Elliot, BSc (Agr) '49, Chairman of Animal Science, Cornell University, was the banquet speaker. His very informative topic was "Animal Science in the Age of Biotechnology."

Under the general chairmanship of Dr. George C. Fisher, Kemptville, Ontario, the organizing committee was composed of Dr. D.A. Barnum, University of Guelph (Program Chairman), Dr. John Moxley, Dairy Herd Analysis Service, and Dr. Bruce Downey, Chairman, Department of Animal Science, Macdonald College. Local arrangements were supervised by Mr. Henry Garino, Director of Extension for the Faculty of Agriculture.

This was the first time in recent memory that Macdonald College has hosted an international event of this magnitude.

Photos by Peter Lewington



Dr. J. Murray Elliot, Chairman, Animal Science, Cornell University, was the dinner speaker.



Professor Steve Spencer moderated a panel with, l to r, Drs. Wyatt Smith, University of California, Jom Hamann, West Germany, Arthur Saran, Israel, John Bramley and Bob Grindal, both from the UK.

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Raptor Day at Macdonald College

Live birds of prey, speeches, seminars, and tours of the Macdonald Raptor Research Centre brought out over 200 invited guests - graduates, associates, and friends - to an informative and stimulating Raptor Day at Macdonald College on September 12.

The Raptor Day Chairman was John Lynch-Staunton, a former Vice-Chairman of the Montreal Urban Community Executive Committee, former President of the Montreal Board of Trade, and President of John de Kuyper and Son Ltd. Vice-Principal Roger Buckland welcomed Clifford Lincoln, Quebec Minister of the Environment as "a determined minister with whom we are pleased and honoured to have close working relations."

Clifford Lincoln's succinct remarks were warmly received by all present. In part, he said, "Time is short for our environment. God created nature and man created pollution to destroy it. Is this the land we want our children to inherit? Nature was created for all of us, humans and animals, and animals suffer because of what we do. Our children also suffer. Governments can only show the way. We have to change our attitudes. One man such as David Bird (Director of the Raptor Centre) can help to change the course of things but we need many David Birds. Help David and the Raptor Centre with funds, thoughts, caring, and by spreading the word."

Mr. Lincoln said that he is proposing legislation to make the Snowy Owl the provincial bird and to protect endangered species.

Robert Carswell, Past President of the Province of Quebec Society for the Protection of Birds and a Trustee of Nature Conservancy, in his introduction to John and Janet Foster, pointed out that these noted wildlife experts "are an important Canadian asset working hard on behalf of the environment." John and Janet Foster took the guests on a breathtaking slide tour entitled "Journey to the High Arctic." Their talk and selection of slides emphasized the great beauty of Canada's North, the fragility of the environment, and the need to value and protect it.



Jean-Luc Grondin, l, artist with his portrayal of the Common Loon which was presented to Clifford Lincoln, Minister of the Environment, during the Raptor Day ceremonies. Dr. David Bird, Director of the Centre, r, with Cia, a Peregrine Falcon, pointed out that a limited edition print of this picture is included in this fall's Bateman/Grondin raffle. Photos by Rick Kerrigan.

Three well-attended seminars: "A Tour with the Osprey" by Charles Schaadt, a PhD student in Wildlife Biology; "Pesticides, Poison, People and Politics" by Professor Stuart Hill, and "Endangered Species - Man's Legacy" by Steven Price, Vice-President, World Wildlife Fund (Canada), rounded out the morning session.

Before guided tours of the Raptor Centre in the afternoon, Dr. David Bird, Director of the Centre, gave a luncheon address and we quote, in part, from it:

"Since 1973 when the Raptor Centre was officially opened by Gerald Durrell, I've been there, watching it grow. I remember vividly all the aches and pains of various setbacks and, of course, the spine-tingling thrills of our successes. I am here today because the Raptor Centre, like the very birds it strives to conserve, is on the brink of extinction. We are at a crossroads. To the left is the unthinkable - closure of the centre's doors; to the right lies optimism, continuation, and success.

"The centre was once nothing more than a handful of hawks and eagles and 10 pairs of kestrels and has now grown to become the world's largest colony of captive birds of prey, close to 500 specimens. What is really significant is what we are achieving with the birds. Most of those 500 birds comprise the kestrel colony, the so-called bread and butter of our research program. The McGill colony is unique in Canada and is one of two such colonies in the world. In the past three years the kestrel colony has been used by 16 graduate students, six McGill professors, seven professors from other universities, four government scientists, and four scientists from the private sector.

"The Raptor Centre's research program is quite diverse, spanning several fields including ecology, behaviour, toxicology, parasitology, nutrition, reproductive physiology, and wildlife management. Over 40 scientific papers have been published in scholarly journals along with two conference proceedings. Thirteen graduate degrees (12 MSc's and one PhD) have been earned by students



Special guests John and Janet Foster admire Miss Piggy, a Red-Tailed Hawk handled by Mario Fradette, one of the Raptor Centre's volunteers.

working under the auspices of the centre, with four more PhD's and six more MSc's currently in the works. Also, 28 senior undergraduate projects have been completed at the centre. Virtually all of our graduates have obtained gainful employment in some aspect of wildlife biology, and that's what a university is all about.

"Last year the centre was officially declared a participant in the National Peregrine Recovery Team, a team striving to put itself out of business. And it's achieving its goal, too. In southern Quebec this summer there were five successful Peregrine eyries, half of the intended goal of the breeding/release program. When this is achieved, will we rest on our laurels? Absolutely not. We are also concerned about other species such as the Bald Eagle or the Loggerhead Shrike that are endangered in many parts of North America.

"All the research and captive breeding efforts in the world are quite useless if public attitudes about the value of these birds are not

changed. That's where public education plays an important role. Since 1983 when the Province of Quebec Society for the Protection of Birds awarded the centre a seed grant of \$18,000, our education program reaches more than 10,000 people annually, ranging from elementary school students to university undergraduates, from brownies and scouts to senior citizens and nature lovers. But there's still six to seven million people in the province that we haven't talked to.

"That is a major reason as to why we also operate a rehabilitation program for sick and injured birds of prey. Each year we receive about 150 incoming patients and, thanks to a recent formalized alliance with the Veterinary School of the University of Montreal at Ste-Hyacinthe, as well as eager co-operation with the provincial fish and game department and the SPCA of Montreal, our success rate of returning birds to the wild is on a par with many other such facilities in North America.

Is it worth spending almost \$200,000 a year on a multi-faceted program to conserve birds



A highlight for the invited guests at Raptor Day was an opportunity to see the birds at close range and to talk with their handlers.

of prey? The answer has to be a resounding yes! Why birds of prey? Why doesn't the centre attempt to conserve all forms of life, including humans? The fact is we are. Raptorial birds share the very top of the food chain with other large vertebrates like whales, grizzly bears and, of course, humans. Whatever problems these carnivores encounter through the pollution of their habitat will surely face us in the not too distant future. That the Peregrine Falcon warned us of the insidious nature of DDT clearly illustrates this. By working toward the conservation of bird of prey populations through management and protection of a healthy environment with adequate space for feeding and breeding, we are simultaneously providing a safe, healthy environment for other wildlife forms and within which to raise our own children. Any environment unfit for birds of prey is one unfit for humans. I don't think of the Raptor Centre as an organization with too narrow a focus. I instead believe the centre provides a spark for the wildlife conservation movement not just here in Canada, but around the world. But that spark, which has been burning for the last 15 years, is now in danger of being extinguished — choked off through lack of funds.

"To function efficiently, we need some financial stability and improved facilities. We can no longer rely on the charity of hard-working, warm-hearted volunteers. There has to be a nucleus of paid, experienced staff to give the birds the care they richly deserve.

"Why doesn't McGill give us full support? The Raptor Centre is only one of many centres of excellence housed within McGill's walls, and all are vying for the attention of McGill's coffers which are currently suffering from a frightening \$40,000,000 deficit. We haven't done badly by McGill. Over the last 15 years, McGill has supplied a spacious compound to house the centre, several original buildings, utilities (which amount to thousands of dollars annually), and many other benefits, and McGill is continuing to support us in our search for financial stability.

"The centre is at a crossroad. To the left lies extinction and failure; to the right lies vigour and success. Please help us to take the right road."

Vice-Principal Roger Buckland was most encouraged by the excellent response to Raptor Day and is looking forward to a positive and fruitful McGill Raptor Development Campaign.

Dr. Arthur Ralph, former President, Laboratoires Wellcome S.A., France and Monaco and a resident of Senneville, Quebec, is Chairman of the McGill Raptor Development Campaign Committee which has established a goal of \$200,000. A team of dedicated volunteers is currently being assembled, who will highlight the centre's programs and needs and will be seeking private support over the next few months.



Seminar speaker Charles Schaadt, PhD candidate in Wildlife, was introduced by Renewable Resources Chairman, Dr. Roger Titman. His talk was on the Osprey.



Dr. Arthur Ralph, Chairman of the McGill Raptor Development Campaign, with Dr. David Bird and Pussy Willow, the Red-Shouldered Hawk.

Fun Fact Fable Fiction

by Ralph H. Estey

Emeritus Professor
Department of Plant Science

Christmas Symbol

As the Christmas season approaches we begin to see and hear references to various Christmas symbols, one of which is the Yule log. Burning a huge oak log once a year to honour Thor, the god of thunder, was an ancient custom of the Norse. After becoming Christians they made the Yule log an important part of their Christmas ceremonies. The word "yule" is synonymous with Christmas to Scandinavians and in Lithuania the word for Christmas really means "log evening". Canadians, in general, follow the Scandinavian tradition and accept "yule" and "yuletide" as meaning Christmas and the Christmas season.

Ancient Cereal

Barley was probably the first cereal cultivated by man; its history has been traced back to the earliest evidences of agriculture. It was the chief bread plant of the Hebrews, Greeks and Romans, but the bread made from it didn't look much like the bread we know today because it was so flat and heavy. Barley contains less gluten than wheat, and gluten is necessary to make light, fine-textured bread. Pot barley is barley which has been ground just enough to remove the husk, whereas pearled barley has had the hull and the germ removed. By-products of pearling include barley flour and animal feeds. Barley flour may be used in baby cereal or for making bread, mixed with wheat flour.

One grain of barley is a barley-corn, three of which were once considered to make up an inch, in crude measuring. Barley was used as a form of money in ancient Babylonia. Today it is the

fourth largest cereal crop in the world, after wheat, rice, and corn.

Camel Power

The camel has probably been man's servant longer than any other creature except the human slave. The Bible tells us that Pharaoh made the gift of camels to Abraham and that Job "the greatest of all the men in the east" has three thousand of them (Job 1:3).

A camel has twice the carrying power of an ox. With an ordinary load of 180 kg (app. 400 lbs.) one can travel for 12 days without water, going 60 km (app. 38 miles) a day. Camels begin to work at about five years of age and, although their strength begins to decline at 25, they usually live to nearly 40.

Golden Age Humour

One of the most disturbing aspects of my advancing age is a growing inability to recall important information, such as the Greek alphabet, the gross national product of Zambia, and where I left my glasses. This became a problem one day last week when, presumably, I went downstairs to get something. Half way down it suddenly occurred to me that I had no inkling of what I was going down to get. Should I go back up and try to remember what it was I needed, or should I go on down and look for something that needed bringing up? Unable to decide, I sat on the steps to think. Within seconds I had completely forgotten whether I was originally downstairs and now going up, or upstairs going down. My easy chair is upstairs so I went up.

Jackson's Hudsons

Mr. Boogie Jackson of Petitediac, New Brunswick, has assembled the world's largest collection of Hudson automobiles. He has collected more than 150 of them, plus thousands of parts.

A Maritime Invention

Abraham Gesner (1797-1854), a native of Nova Scotia, invented a distilling process for refining oil obtained from coal and from a natural bitumen now known as Albertite (named for Albert County in New Brunswick). Using this process he obtained, in addition to gasoline, an illuminating fuel for which he coined the name kerosene in 1850. For many years it was also called "coal-oil" and, incorrectly, "paraffine-oil." Paraffine-oil was invented by a Scottish chemist, James Young, at about the same time Gesner was refining the first kerosene.

Explosive Candy

In 1924 chocolates were exploding or bursting on the shelves of confectionary shops in Montreal, Toronto, and various other places in Canada. The cause was found to be due to the growth and activities of yeasts in the candy.

Kew Gardens

There are more flowering plants in the Royal Botanic Gardens of Kew, England, than in all the botanic gardens of Canada put together.

High Mountain

The world's highest mountain is usually considered to be Mount Everest, but the world's tallest mountain, measured from its base in the ocean, is Mauna Kea, Hawaii.

An Old Riddle

The following riddle is taken from the Royal Crown Phonic Primer, published by Thomas Nelson and Sons Ltd.

Two legs sat upon three legs,
with one leg in his lap.
In comes four legs and runs
away with one leg.
Up jumps two legs, catches
up three legs, throws it at
four legs and makes him
bring one leg back.

If you can figure out what that is all about, you are as brilliant as the average 12 year-old student in the public schools of Ontario around 1910.

A Matter of Honour

There was a young lady of Want-age.
Of whom the Town Clerk took advantage.
Said the County Surveyor
"Of course you must pay her
You've altered the line of her
frontage."

Sea Animal Senses

Dolphins listen with their jaws, and seals "see" with their ears. (New Scientist, March 12, 1987)

Lasting Language

With reference to automobiles, most of us are still "blowing horns," even though our cars haven't had horns, or any other "blowing" device, for several decades. The first car makers to abandon the horn referred to their electrical sound emitting device as a klaxon, and the expression "sound your klaxon" replaced "blow your horn" but only for a very short time and by relatively few car owners.

Seeking Solutions

Research Reports

by Dr. Robin K. Stewart,
Associate Dean, Research

On returning in August from a very pleasant holiday, it was suggested that I might like to produce an article complementing the series on Crop Improvement which appear in this present issue. Given the deadline for production of the article, I have not been able to consult adequately with the various authors, and I hope what I say does not contradict what is said by them. The titles in the series reminded me very strongly of a series of features which appeared recently in *Bio-science*. These features addressed such areas as Biotechnology in Agriculture, Plant Breeding, and Plant Productivity not so much from a scientific viewpoint, but more from the social, ethical, and research management aspects. I would like to share the gist of these features with you.

If we look at the development of agriculture in North America since the second world war, there have been three major trends. Firstly, there has been the reduction in the number of farms and an increase in the size of farms. Secondly, there has been an increased industrialization of food production, in that on farm costs have become a much smaller component of total food costs. Finally the use, by the grower, of purchased inputs such as fertilizers, herbicides, and pesticides has greatly increased. Putting it simply, agribusiness and not the farmer dominate the economics of the food production systems.

Perhaps it is fair to say then that, whether a researcher in crop improvement is using the new biotechnologies or more traditional plant breeding methods, the traits that he selects for may be determined not by the needs of the grower but by the requirements of the more "powerful" components of the food system.

The argument goes as follows. Before modern plant breeding methods were developed, farmers usually planted a number of traditional varieties to ensure a modest but relatively stable production level. Ecologists claim that this is a sound practice in that diversity promotes stability in the eco-system. In practice, if a mosaic of varieties of the same crop or of different crops is used, out-

breaks of plant pathogens or insect pests are discouraged. In response to the needs of machinery and food processing industries modern agriculture has been developed to emphasize monocultural patterns. Yields are certainly increased as long as optimal conditions (including purchased inputs) are maintained. A problem, however, with the monocultural system is that it is biologically unstable and requires constant energy inputs to maintain stability. Failure to meet the fairly rigid requirements for fertilizers, herbicides, etc., can lead to drastically reduced yields. One consequence of this is that plant breeding research now concentrates not so much on increasing the theoretical yield of a variety but more on incorporating resistance to a range of diseases, pests, and adverse weather conditions.

There is another reason for this change in emphasis in research. Ten years ago there seemed to be an absolute shortage of food at the world level. Currently we are faced with a situation where crop production far exceeds

market demand. Surpluses exist while commodity prices have dropped.

The strategy then is not to increase total yield but to reduce input costs while guaranteeing production stability. Increasing productivity does not necessarily mean increasing yield. It can mean the same yield at a lower cost. This is the effort to which I think our researchers at Macdonald are contributing. They are using traditional and biotechnological tools to improve the efficiency of crop plants. They are developing varieties which are resistant to pests and diseases, competitive with weed species, are tolerant of different weather and soil conditions, and require less input energy to maintain yields.

On first consideration it might appear that our efforts are in conflict with those of agribusiness, but I do not think this is so. Efficient use of crop protection chemicals and a stable food production system will benefit all sectors of the system as well as society in general.

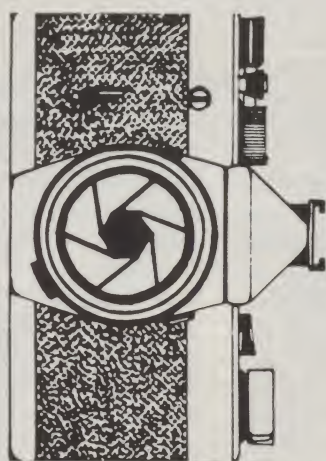


PHOTO PLUS

457-5211

Jean-Paul Proulx
photographe
63 rue Ste-Anne
Ste-Anne de Bellevue

Campus Life

Convocation Address

by Dr. H. F. MacRae
Principal Nova Scotia Agricultural College

(Dr. MacRae received the Honorary Degree at Convocation on June 5, 1987. It is no easy task to try to condense his address for these pages. One does not wish to miss a word he says, and we risk, with justification, being chastized for whatever we omit. Dr. MacRae told his audience that he was proud to be part of McGill and quoted a telex he had received: "an honorary degree is like a curl in the tail of a pig. It follows the main part of the animal. It is highly ornamental and in no way does it improve the quality of the ham." He acknowledged his great debt to the late Haddon Common and the impact he had had on his life and career. He thanked his wife Mary for her devotion, her support, and her management of their home. He recalled his years at Macdonald and quoted from a special poem composed by Dr. Bill Rowles and he congratulated those receiving their degrees and he continued...)



Dr. Herb MacRae with his wife Mary, son Rob, and Wilf Kaiser, BSc (Agr Eng) '87. Wilf is from Dr. MacRae's home town, Baddeck, N.S.



"Who's from the Maritimes?" "We are!" said this happy group surrounding Dr. Herb MacRae.

"I do wish to leave some thoughts with those who go out from this place today and the challenges for them in whatever it may be in that diverse activity we call agriculture. A Task Force recently prepared for the University of California reminded me very vividly that agriculture attained a preeminence in my generation unheard of in any previous one as a result of research and the development of new technologies which were rapidly

adopted by those who produce our food. The agriculture of my generation sustained large population increases, created improvements in human health and escalating standards of living for many people. But, in spite of all these exceptional achievements in sustaining life, there is an increasing awareness and concern that those practises which dramatically increased productivity and efficiency are damaging the resources on which agricul-

ture is based. A deterioration of soil and water quality, all too painfully obvious, the recognition that a large percentage of modern farming is dependent on some inputs that are potentially hazardous and certainly non-renewable, raises very valid questions as to whether some current agricultural systems can or should continue. The benefits of a flourishing agriculture have generated, in some cases, high costs in natural resources, in energy, in environmental quality and, at the present time, paradoxically, in reduced profitability to farmers. There is increasing awareness that the sustainability of agriculture and its many contributions will require alterations of some existing practises and systems.

"Let us be positive about this and recognize that the current economic problems in agriculture and the immediate concerns about our natural and human resources should serve as an incentive for long-range research. As the University of California Task Force states, 'Universities, although they do not hold a monopoly, surely offer a proven system for attacking these problems. Those who with competence and knowledge study, research, and practise agriculture know all too well there are no quick-fix answers. It is precisely



A hearty round of applause greeted the popular Susan Morgan, I, and Beth Armour, seen here with Registrar Steve Olive. Susan and Beth, Clinical Coordinators, Professional Practice (Stage) in Dietetics, received their Masters in Education on the Macdonald campus and not on the downtown campus where they studied for their degrees. The two MSc graduates requested that they receive their degrees at Macdonald and, obviously delighted, their wish was granted. Beth is still a Clinical Co-ordinator; Susan is now in Marketing and Marketing Research with the Halls Group in Pointe Claire.

the quest for long-term answers that will achieve the kind of agriculture the future will demand and be able to sustain.'

"Let me remind those who graduate today that all this must not be a source of discouragement but a challenge. Technology has many features in common with the natural laws. If there is a potential for good, there is probably an equal potential for evil and history is replete with examples. There is no doubt that the new technologies which are rapidly emerging in the field of biotechnology will revolutionize the way we will produce our food in the future and there is no doubt that systems will need to change and the winds of change are upon us. In my role with the Canadian Agricultural Research Council, we see a trend emerging for the future as a National Agriculture Strategy develops. As we move toward the 21st century, agricultural researchers will be looking more and more to the new biotechnologies and information technologies to provide the necessary state of knowledge to improve the efficiency and stability of food production

and to increase profitability. Agricultural researchers will be challenged continually by the growing environmental protection and health concerns of the consuming public. Objectives for agricultural research will be oriented increasingly to greater food safety, improved nutritional values, and more resource-sparing technologies.

"The graduates of today have a right to say, 'Please move over and make room for us.' In the next 10 to 20 years you will become the scientists, the educators, the political shapers, and the protectors of civil rights. In those years, you will set new social standards, new ways to help the sick and the poor and you will find new ways to produce and distribute our food because you must. It will be your generation that will decide whether or not the exciting new technologies will be put to good use.

"There will be serious conditions to be met in this great endeavour, and the most serious one is that you be competent. To have credibility, you must be knowledgeable and competent, and you will need an abundance of patience and tact to change things. A colleague and friend of mine regularly reminds me that the most difficult person to deal with is the highly motivated incompetent.

"In this great drama we call life everyone is on stage and a part of the drama; some will have major lead roles, others lesser ones but all important to the drama and still others will be part of the crowd-scene looking on. I urge you not to lament too fervently what is wrong with the present play. My generation did not write the perfect script and provide the perfect actors, any more than your generation will. But your generation can stage for itself a play that is the best possible one based on the best available knowledge and expertise and having regard to all those environmental factors which will be beyond your control.

"It would also be my hope that each of you will never forget the great privilege it is to have been born in or adopted by this country Canada and that you will give it your best.

"Robertson Davies recently commented as follows: 'Can you seriously think that Canada unlike every other country in the world lacks an essence that is the outcome of the history it has undergone, the races who have lived in it, the unique land and climate that are its geographical being. I am convinced that Canada has a soul and should get on better terms with it because at the moment it is a sadly neglected part of our inheritance - it is a battered child among souls; it needs nourishment, exercise and fresh air and above all love'."



Two valedictorians, two languages, two Julies: Julie Bélanger spoke in English and Julie Paquette (at the podium) spoke in French.

Rings: Symbols of One's Profession

Two separate groups of students graduating from Macdonald participated last April in ring presentation ceremonies. The Agricultural Engineering students and staff went to the downtown campus of McGill for their ceremony; members of the Association of Canadian Home Economics Students (ACHES), staff, and guests gathered at the Walter M. Stewart House at 7 Maple.

Macdonald Engineers

On April 2, the graduating class of McGill engineering students took their oath of obligation in the Ritual of the Calling of an Engineer. Forty-four Agricultural Engineering students from Macdonald took part in the ceremony. During this ritual, often called the

"Iron Ring Ceremony," the soon-to-graduate engineers take an oath to conduct themselves in a professional and ethical manner during their careers in engineering. They receive a plain iron ring as a reminder of the oath and a symbol of the strength of "cold iron" upon which they have sworn their oath.

This ritual is a uniquely Canadian idea which emanated from a meeting of seven past presidents of the Engineering Institute of Canada in Montreal in 1922. Rudyard Kipling, the famous poet, consented to assist in devising an oath and ceremony to bind engineers into a professional "fraternity;" the first group of engineers to be obligated took their oath in Toronto in 1925. The first Montreal cere-

mony was in May 1926. It is a tribute to Kipling's insight that the oath, ceremony, and symbols used remain unchanged to this day and virtually all engineers across Canada take this oath at the beginning of their careers.

Macdonald Home Economists

On April 30 graduating student members of ACHES gathered for a reception and the 19th Ringing Ceremony. As Faculty Adviser for ACHES, Mrs. Liz Jennaway-Eaman welcomed everyone and gave the opening remarks. The graduates' prayer was led by Dr. Shirley Weber, and Dr. Betty Statford-Smith explained the history and significance of the ring.



Agricultural Engineering students and three staff members, front row, 1 to r, Justin Larouche, Jean-Denis Major, Stephen Leonard, Edward McKyes, Eric Norris, Robert Broughton, Pierre Chapdelaine, Mashalla Farahzad, Raymond Cholette, Richard Turpin, Sami Mouallem, Sylvie Charbonneau. 2nd row: Jacques Denis, Yves Tetrault, Jafar Hajahmadi, Pierre Tremblay, Hubert Dubois, Danielle Courtemenche, Daniel Larose, Craig Kent, Mohammed Ajzachi, Charles Fournier, Lucie Masse, Martin Chagnon. 3rd row: Johannes Dorcelly, Ramine Chabazi, Ray MacKenzie, François Dominique, Paul Gaudreau, Ward Smith, Craig Fawcett, Dave Young, Raphael Giordano, Ian McKinnon, Roger Kinsman, Charles Allard. 4th row: Yvonne Galanov, Stephane Burgoyne, Denis Berube, Pierre Reid, Luc Marseille, Frederick Brown, Dave Parrish, François Rondeau, John Russell, François Granger, Sylvie Jalbert.

The idea for a professional ring for Home Economists was first conceived at the 1967 annual meeting of the Home Economics College Clubs held at the University of Saskatchewan in Saskatoon. Delegates from eight colleges across Canada voted to accept a ring as a national symbol representing professional Home Economists. Its purpose is to act as a unifying force within the profession, to increase professional pride, and to act as tangible proof of the ideas and ethics of the profession.

The ring, to be worn on the small finger of the working hand, is 10 karat yellow gold featuring a shank with 10 facets across the top. The yellow gold denotes the warmth of home and family and the many facets represent the many facets of the field of Home Economics: Food, Nutrition, Dietetics, Clothing and Textiles, and Consumer and Family Studies. The circular form upon which the facets are located represent the necessity of union of all areas to fulfil the purpose of promoting the welfare of the family and the home.

The graduating students were presented with their rings and Liz Jennaway-Eaman led the graduates in reciting their pledge. The Quebec Regional Director of the Canadian Home Economics Association (CHEA) Sandra Henrico brought greeting and also presented the CHEA Membership Incentive Award to Karen Lyn Mudie in recognition of her leadership qualities. The award is a one year complimentary membership in the Association.

Cold iron, yellow gold. Two different rings; both to be worn with pride and a sense of achievement.



Presented with rings at the Ringing Ceremony, seated, 1 to r, Sonya Page, Karen Lyn Mudie, Emily Fraser. Standing: Julie Lockwell, Judy Coffin, Louise de Courval, Marie Christine Tessier, Betsy Wells, and Thomas Hunter. Absent from photo: Sheila Claudi, Sophie Courchesne, Cheryl Goldman, and Heather Nathens.



Sandra Henrico, Quebec Regional Director of the Canadian Home Economics Association, presented Karen Lyn Mudie with the CHEA Membership Incentive Award.

Reunion '87

A DAY TO REMEMBER

In the splendid setting of the campus and with the cooperation of the fall weather, the Saturday, September 26, activities began with registration in the Macdonald Stewart Building. Old friends greeted each other as if graduation day was yesterday. "You haven't changed a bit," "It's so good to see you again" or similar remarks were heard repeatedly. The Macdonald Stewart foyer was bustling with graduates spanning the years from 1922 to 1987, all anxious to reminisce about the last five, 10, 25, and even 50 years!

Early risers had the opportunity to browse around the Mac Stewart Lounge where class photos were displayed and juice, coffee, and muffins were served by students belonging to the Food and Consumer Affairs Association (FCAA).

Team spirit was evident in a number of Mac staff who offered their time, energy, and expertise to graduates in providing a large choice of activities throughout the day.

The day's program kicked off with guided tours of the greenhouses offered by Christine Rafuse and Susan Delafield. The School of Dietetics and Human Nutrition, located in the Macdonald Stewart Building, cordially invited graduates to take part in an informative display to learn more about nutrition, health, and fitness and how they relate to our lives. There were "open house" visits to the Lyman Entomological Museum and the Library, courtesy of Mr. Chia-Chi Hsiung and Janet Finlayson. Later in the day, Professor Alan Watson opened wide the doors of the new Plant Pathogen Containment Facility housing laboratories, growth chambers, and a sophisticated filter system to identify and develop biological control agents. Graduates were given the chance to find out in more detail the process behind this "Plant Quarantine Establishment."

A varied selection of panelists offered their views on two thought-provoking and modern topics of concern: "Food for Fast Times" and "The Future of the Family Farm." The expertise in both areas was evident by the large turnout of graduates and by the enthu-

siastic question period following each seminar.

Many graduates took advantage of the van tours of the campus run throughout the day. A scheduled stop en route was a visit to phase I of the new Cattle Teaching and Research Facilities where Farm Director Rudi Dallenbach offered guided tours of the complex, placing emphasis on the wealth of research technologies.

For many the day was a nostalgic trip down memory lane. For others it was an opportunity to see first hand the advancement of teaching and research at an institution they are proud to be a part of. For all, it was a day to remember.

THE MAIN EVENT

The foyer of the newly renovated Centennial Centre was the setting for this year's Macdonald Branch Annual General Meeting. The Meeting was convened by Honorary Secretary Katherine MacLean, BSc (Agr) '81, and reports were presented by the executive of the Branch. The President, James Wilding, BSc (Agr) '54, highlighted the many branch achievements and involvements over the past year, including the opening of the new Cattle Teaching and Research Facilities and the efforts of the Macdonald AMF Committee in raising over \$70,000. At the conclusion of the meeting Jean McHarg, BSc (HEC) '60, incoming President of the Branch, presented Mr. Wilding with a special gift to mark the completion of his very successful term of office. There was an enthusiastic response from everyone present.

Macdonald graduates, spouses, friends, and staff then proceeded upstairs to the Centennial Centre Ballroom where more than 180 guests were seated with their former colleagues. The Luncheon Chairman, Jean McHarg, opened the ceremonies by extending a warm welcome and announcing two special awards. The first was for the graduate who had travelled the furthest distance to attend Reunion '87. Jim Currier, BSc (Agr) '52, was a definite winner in this

category having travelled from Auckland, New Zealand, to visit with his classmates. The second honoured the most senior graduate present, J. Stewart Buchanan, BSc (Agr) '22, who was celebrating his 90th birthday and clearly the eldest graduate in attendance. Both graduates were awarded special gifts to mark the occasion. The Chairman then called upon Douglas Pashleigh, BSc (Agr) '52, to say grace and subsequently Dean Roger Buckland toasted the classes of '37 and '62. Dr. David Popkin, BSc (Agr) '62 from Saskatoon responded with a warm and memorable toast to Macdonald College.

During dessert and coffee, the 50th and 25th Reunion classes of '37 and '62 respectively received their commemorative pins from Dean Buckland who personally congratulated each graduate in attendance from the Class of '37. Wendy (Cliff) McDonald, BSc (HEC) '62, and Dr. Hugh Saben, BSc (Agr) '62, accepted pins on behalf of their class who only have until 2012 to reach the distinguished status of the Class of '37.

Next on the agenda was the presentation of the Honour Shield for the Reunion class with the best registered class participation. The Class of Agriculture and Home Economics '37 won with a landslide victory of 52 per cent of graduates in attendance. A tremendous effort! The Class of Agriculture and Home Economics '52 came in second with a 26 per cent class participation. Trinkie (Hooker) Coffin, BSc (HEC) '62, Chairman of Reunion '87, was asked to come forward and present the Honour Shield to Scott Kneeland, BSc (Agr) '37 - the driving force behind the impressive turnout of his classmates.

As the proceedings continued, Dean Roger Buckland, Dr. Harriet Kuhnlein, Director, School of Dietetics and Human Nutrition, and Douglas Waterston, BSc (Agr) '45 were called upon to unveil a special plaque and pay tribute to the efforts of the Class of '45 in raising over \$10,000 to help equip a lab in the School. A team effort that deserved much praise.

In closing, Dr. Buckland thanked the graduates for coming considerable distances to attend Reunion Weekend with old friends and promised to respond to the questions that all graduates might have during his reception. Special thanks were also extended to the Reunion Committee chaired by Trinkie Coffin, to Greg Weil and Susan Reid of the Martlet House staff for their assistance in coordinating the Reunion '87 program.



The Class of Agriculture and Home Economics '37 received the Honour Shield for best attendance at Reunion. This class was brought together by Scott Kneeland, seen here receiving the Shield from Trinkie (Hooker) Coffin, BSc (HEc) '62, Reunion '87 Chairman.



Toast to Macdonald

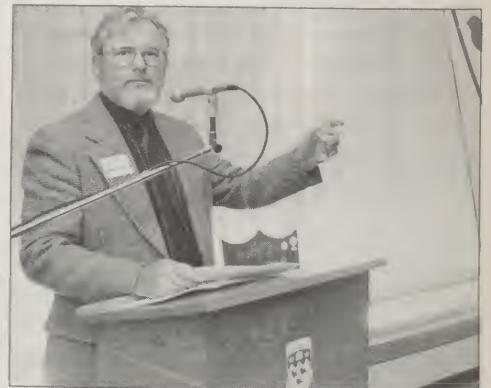
Dr. David R. Popkin, BSc (Agr) '62, was asked to make the toast to Macdonald College. The following are his remarks:

"If you take a moment to look around you, you will undoubtedly see many faces that you don't recognize, but today that doesn't seem to matter, does it? Why is that? I would suggest it is because we all have a sense of belonging. We all share a bond not eroded by time or distance. We all share equally the pride of having been a student at Macdonald College.



Some of the members of the 25th anniversary class - Agriculture and Home Economics '62 - gather for a photo session at the Reunion Luncheon.

Douglas Waterson, BSc (Agr) '45, and classmates with Dr. Harriet Kuhnlein, Director of the School of Dietetics and Human Nutrition, at the unveiling of the Class of '45 laboratory plaque at Reunion '87.



Dr. David Popkin, BSc (Agr) '62, proposes a toast to Macdonald College at the Reunion Luncheon.

We alumni are grateful to Macdonald College of McGill University for it was here on this very campus where most of us encountered our first real intellectual challenges, where many of us formed friendships - the kind that last a lifetime. It was on this campus that some of us spent our first years away from home, where we matured from adolescence to adulthood.

This college is a very special place for us, and we have gathered here today to indulge ourselves in fond memories of the past, to renew old friendships, to become reacquainted with the goals and objectives of Macdonald.

We are, of course, vitally interested in the future of Macdonald College so as alumni we offer our support and encouragement to Vice-Principal Buckland and all the members of this college as they strive towards excellence.



Jim Wilding, BSc (Agr) '54, was thanked warmly by the incoming President, Jean McHarg, BSc (HEc) '60, for his hard work and service to the Branch and was presented with a pewter tankard in appreciation.

The Class of '62!

Our 25th Anniversary Class Reunion — the whole weekend — was just great. The success of the Reunion made us all proud to be part of the illustrious Class of '62!

We attended the seminar "Food for Fast Times" moderated by Dean Buckland. Fred van de Voort's presentation on food processing "Beyond the Farm Gate" was for most of us graduates an excellent opportunity to get up-to-date on work carried out in the Department of Food Science and Agricultural Chemistry as it responds to the many challenges in the food industry.

The seminar that followed "The Future of the Family Farm" was also an excellent opportunity to consider the various alternatives and advantages of the family farm. As Macdonald graduates we feel this kind of information affords us with an opportunity to upgrade and enhance our extension skills.

We enjoyed our class dinner at Tadjia Hall, and the next morning we went for brunch at Garth and Trinkie Coffin's which gave us an excellent opportunity to "continue the conversation where we left it the evening before." An excellent Reunion.

Louis A. Bernard, agronome
Regional Extension Specialist
Department of Agriculture
St-Hyacinthe, Que.



J. Stewart Buchanan, BSc (Agr) '22, from Massachusetts, was congratulated by Dean Roger Buckland for being the oldest graduate in attendance at this year's Reunion.

The Class of 1945 "Adopts a Lab" at Macdonald

At Reunion '85, the Agriculture and Home Economic graduates of the Class of 1945 launched a project to raise \$10,000 from classmates to help equip a lab in Human Nutrition. Recently, they reached their goal and actually surpassed the \$10,000 target. The class will continue to support, through Annual Giving, the development of this lab. At this year's Reunion luncheon several classmates, led by Douglas Waterston, BSc (Agr) '45, returned to participate in the unveiling of a plaque commemorating their Class gift. The plaque reads as follows:

Laboratoire promotion 1945

La mise sur pied de ce laboratoire de nutrition humaine est due à la générosité des étudiants d'agriculture et d'économie ménagère de la promotion 1945 du collège Macdonald. Leur appui suivi profitera aux générations futures d'étudiants.

Class of 1945 Laboratory

The development of this human nutrition laboratory has been supported by the Macdonald College graduates of 1945 in Agriculture and Home Economics. Their continued support will benefit future generations of students.

The plaque will hang at the main entrance to the new Human Nutrition Research Laboratory on the main level of the Macdonald Stewart Building.

Dean Buckland, in his closing comments at the luncheon, thanked the Class of 1945 for their generous support and leadership in establishing this most important project.

Other classmates present included:

Katherine Drayton Gray, BSc(HEc)'45
Martha Cochrane Wake, BSc(Agr)'45
Marjorie Lane Hodgson, BSc(HEc)'45
Marguerite Kenney Brower, BSc(HEc)'45
Frances Smith Andrew, BSc(HEc)'45

The students, faculty, and staff of Macdonald College wish to express their gratitude to the Class of 1945.



Dean Roger Buckland presents Jim Currier, BSc (Agr) '52, with a special engraved gift for being the graduate travelling the furthest distance - Auckland, New Zealand - to be at Reunion '87.

Beyond These Gates

Ottawa Barbecue

by Elaine Vininsky, BSc (Agr) '80

Plans had been in the offing for some time to have a special get together for Macdonald grads in the Ottawa area. With the encouragement of Jean McHarg, BSc (HEc) '60, and Don Grant, BSc (Agr) '60, MSc (Agr) '62, PhD '66, Gib Patterson, BSc (Agr) '60, willingly offered to open his farm home in Metcalfe, Ont., for a summer party. The first event was held last summer and, if you ask any of the 90 participants at this year's outing last June 14, they would likely have said they were glad that Gib was taken up on again on his kind offer.



Three generations of Alister MacLean's family enjoyed the day's outing. The children took part in the activities co-ordinated by McGill Physical Education students who were on hand for the event.



Former Dean Lew Lloyd welcomes Elaine Vininsky, author, to the Ottawa area.

The hot, lazy day was perfect for renewing old acquaintances and meeting new ones. Among the notables spotted were Drs Laura and Bill Rowles seated across from Bill's former students Wallace Johnston, BSc (Agr) '48, and Joyce Johnston, BSc (HEc) '50. Laura Rowles holds the honour of being the first woman to get her PhD in Physics from McGill. She taught full time at Macdonald until the depression interrupted her career and then she filled in at the college whenever needed. That is where she met her husband who retired from Macdonald in 1971. He recounted his bachelor days when he studied on the Montreal campus and then



Don Grant, 1, catches up on the news with former Dean, Dr. George Dion and his wife Wendy.

caught a Ste-Anne-de-Bellevue-bound train to teach at the college.

The Johnstons have fond memories of their professor: "It was a pleasure to have Dr. Rowles for first year Physics, second year Calculus, and third year Biophysics." Coincidentally, Wallace Johnston was the principal at the high school where Gib Patterson taught.

Alister MacLean, BSc (Agr) '40, MSc (Agr) '42, topped the list for bringing the most guests. He was accompanied by his wife, three daughters, their spouses, and seven grandchildren, for a total of 15. An affable man, Dr. MacLean worked in industry and taught before getting his PhD at age 40 from Michigan State University. He subsequently did research at the Land Resources Institute of Agriculture Canada.

The event was billed as a three deans' roast, but Roger Buckland took all the barbs from former deans Lew Lloyd and George Dion. They challenged his remarks about graduating an average of 300 students a year based on an enrolment of 900. "Did you graduate them all?" George Dion chuckled.

Roger Buckland reflected that his two years as Dean of Macdonald have been rewarding and challenging. Looking back even further, he noted how Macdonald had grown since his graduation in 1963 when 100 students donned caps and gowns. With a happy sigh, Dr. Buckland described the present students as hard working and "not rambunctious." He remembered the early days of the 1970s when students put greased pigs in the residences and blocked the entrances with bales of hay after their final exams.

He surprised some post 1967 graduates when they learned that the student society had moved to Harrison House from the Centennial Centre. As well, Mehdi Abdelwahab, BSc (Agr), '74, MSc (Agr) '79, a former hard-working bartender and now a consultant, discovered that the Ceilidh and the old Bar Disco were being gutted for offices and

classrooms and that the Lounge in the CC is now a Macs-only pub.

Roger Buckland also told the group about the new cattle teaching and research facilities. He described the new agricultural economics Masters program and the reorganization of the School of Dietetics and Human Nutrition

and the Department of Food Science and Agricultural Chemistry.

Later on participants sat at picnic tables under a big tent and feasted on barbecued chicken, potato salad, cole slaw, dessert, and coffee. It was billed as an afternoon affair, but the ambience and hot weather kept everybody going until past dinnertime.



Graduates and friends enjoying an Ottawa Valley barbecue at the farm of Gib Patterson.

Profile: Gib Patterson, Ottawa Host

Host Gib Patterson obtained his BSc in 1960. Two years later he followed in his Irish ancestors' footsteps and planted potatoes on his newly purchased farm in Metcalfe, Ont., on the outskirts of Ottawa. Over the years the land has also produced grain to feed a dozen milking cows.

In recent years Gib has scaled down his agricultural activities and now grows oats which he sells to a local co-operative. Son Martin uses the chaff to mulch the plants at his Orleans U-Pick berry farm.

From 1962 to 1971 Gib taught a variety of subjects, including mathematics, chemistry, geography, and physical education at

Osgoode Township high school. After he finished his teaching career, he began the first of several commercial golfing ventures. He can now boast of owning two driving ranges, an 18-hole miniature golf course, and a soon-to-be-completed regular course near Manotick Station. He is also part-owner of a real estate company which converts bushland into housing developments. Gib's wife Elsie does bookkeeping and general office work for these companies.

Surprisingly, Gib is not an avid golfer, although he does like to play an occasional game. Elsie Patterson recounted one humorous story of how her husband used to tee off at 5 a.m. on Sunday morning and then show



Gib Patterson, third from left, with son Kevin, wife Elsie, and daughter Jill seen here at the close of another successful barbecue.

up at church several hours later still clad in his golfing outfit.

The Pattersons recently celebrated their 25th wedding anniversary. They have four children. Daughter Jill has the distinction of being the 1985 Miss Teen Ottawa-Hull.

We would like to offer our sincere thanks to

The Macdonald Branch of the McGill
Graduates' Society

for the encouragement and support given to

The Macdonald Journal

We do appreciate it!

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Diploma Corner

(The following letter was received by Professor A.R.C. Jones of Woodland Resources in the Department of Renewable Resources earlier this year. We are delighted that both the writer and the recipient agreed to allow us to use it as a Diploma Corner.)

Dear Professor Jones:

You may or may not remember me, but I sure remember you from my "Delightful Dip Days." I've read quotes from you in various Canadian magazines I subscribe to (*Canadian Geographic*, and *Harrowsmith*). If I see you on TV (*Country Canada* or whatever) I jump up and down and yell to Frank, "Look! Quick! It's my forestry prof! My Gosh, he doesn't age! He's a really nice guy - you should've known him."

Well, it makes my heart ache for trees when I read the articles. Guess where this Dip '74 is now? On the prairie! I'm married with two beautiful blond, blue-eyed smiling children. A boy who will be five on July 7, that's Benjamin, and Susie, who just turned three yesterday. My husband Frank is a clerk in a liquor store in Lethbridge. We live in a little bungalow in Coaldale just six miles from Lethbridge. It's not much, but we're comfortable and hey, we own two apple trees, a birch, two saskatoon bushes, and two Nanking Cherry bushes we planted with our own two hands - plus the various cedars and juniper bushes.

I never married a farmer (for which I now thank God!) as some men out here are still pretty backwards in their thinking about the female of the species. None of the farmers believed I could bake a cherry pie and drive a 4040 John Deere!

In 1975 I managed a dairy farm in Ontario. In 1976 I went to Australia alone and visited my sister in Perth, visited dairy and beef stations, etc., went to New Zealand, and returned to North America to work on a 12,000 acre ranch in Wyoming. I was going to stay there forever but zipped up to Alberta to work for another Red Angus breeder. Then I worked on a dryland farm. There was a drought and



Husband Frank, Ben and Sue with Debbie in her prize-winning garden in Coaldale, Alberta.

he couldn't afford me since there wouldn't be anything to harvest so I worked on a dairy farm in Picture Butte.

In 1978 I met Frank. I knew within a week that this was the guy for me. How sad, I thought, that we weren't living on that beautiful ranch in Wyoming, at the foot of the Bighorn Mountains. Oh well, the prairie has its moments too. I do like to watch the sky, and there's plenty of that!

Frank and I got married on the lawn at my Dad's country place near Magog in July 1978. Frank had been a banker but didn't like what the pressure to get ahead was doing to him; he smoked two packs and drank at least 24 cups of coffee each day. He also didn't like stepping on people to get ahead. So now he's a liquor store clerk and much calmer and happier. A real family man. I had a pretty wild life for many years. I guess I was ready to settle down. Here we are, the average couple. Two kids (no more Travis the dog, sadly), a station wagon, milk delivery - the whole suburban shebang! Am I happy? You

bet your hiking boots! The only time I get restless is in spring when I see the farmers out seeding their fields and the newborn calves in pastures by the road. It makes my heart ache a bit. But since my Dip years, my spirituality has grown by leaps and bounds and I'm a regular fixture in our church. Sunday School teacher, guitar player, and song leader, etc. I speak my mind when it comes to politics, too. Life is too darn short to beat around the bush (unless you're into forestry!). If you see wrongs being committed, speak up! Jesus always did so I will. I'm a "stick up for the underdog" kind of woman. So I realize God didn't want me to indulge myself with farming and playing with animals. I'm more useful when I sing for old ladies at the Senior Citizen's Home, or deliver "Meals on Wheels," or visit terminally ill people, or collect newspaper for recycling, or teach my children my love and respect for nature at the local reserves and parks. My other big thing is gardening. I have an intensive garden with raised beds 4 by 12-feet long, and I tell my children about the joy there is in watching things grow under your own hand. There is

a spirit that links all living things on this planet. If you cut your finger, you (your body) know it and you're put under stress. This world is one body. Injure one part and the world gives a little shudder. When acid rain is slowly torturing a tree to death everything suffers.

Oh dear, I do go on. I can't help it. I've taken various writing courses and have written lots of stuff but have been too chicken to submit it. However, to finish my present course, I have to submit an article or story to a publisher. So I'm doing one on "Bird Feet" for a kid's nature magazine. Wish me luck!



Before marriage Debbie travelled the world working on farms and ranches.

Thank you for being such a terrific prof and a basically fine human being. You made a great and lasting impression on me way back then, even if I never let on. There are three or four professors and employees of Mac (speaking of Gordie Beaulieu there) that I try to emulate. You're one. First class all the way. Well done, good and faithful servant!

If you're ever out this way, you and your wife, stop by and Frank will BBQ you some great Alberta beef!

Debby (Gurd) Gregorash
1007-21 Avenue
Coaldale, Alta
T0K 0L0

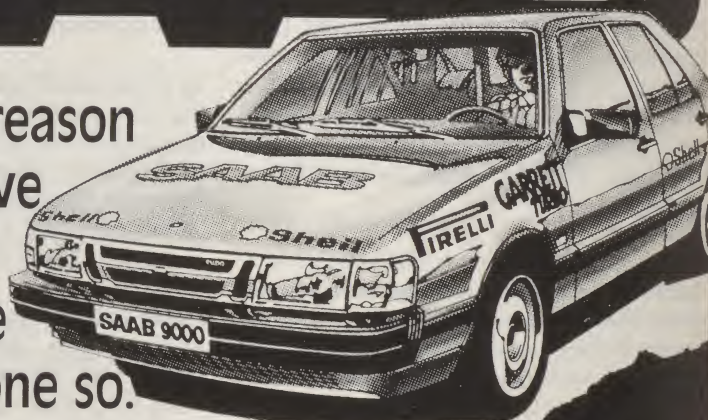
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QWI

Executive Corner

ACWW Council Meeting

The 1987 Associated Country Women of the World (ACWW) Council Meeting was held at the University of Reading in England from July 20 to 23, 1987. Professor Colin Spedding, Pro-Vice Chancellor in his welcome to the delegates pointed out that agriculture is their third largest department, but it is the largest in Europe, and they are very proud of the number of graduates who have gone on to be ministers of agriculture. A large percentage of their students come from developing countries. He felt that women were greatly under used, and we should encourage them to get formal education in agriculture. Professor Spedding ended with an old Chinese saying: "If you do not change direction, you will end up where you are going."

The guest speaker who set the stage for the entire meeting using the theme "Women in Agriculture" was Dr. Michael Wales, Commonwealth Secretariat, who spoke mostly about women in developing countries. He pointed out that women are denied agricultural extension services. Most extension workers are men and there are social and cultural barriers to them having contact with women farmers.

Women are also denied access to foreign aid and credit. These go to the male family head, landowners who administer the cash crops while women, who are the small farmers, are producing the food to feed their families and to sell locally. It is the women who need the training and financial support. Dr. Wales suggested we get women to work for the National Development Bank, get women on the Board of the World Bank, and on the International Monetary Fund. Perhaps then they would be more willing to listen to the needs of women in agriculture.

Lucy French
QWI President

Edna Lillian Smith

It is with sincere sorrow that we announce the death, after a lengthy illness, of Edna L. Smith on September 13, 1987. Edna Smith, a member of the Belvidere Branch of the Sherbrooke County Women's Institutes, was a past President of the Quebec Women's Institutes.

Born in Albert Mines on October 4, 1904, educated at Lennoxville High School and Dudley's Business College, Edna Smith's steadfast loyalty to the Institute and her keen knowledge of the constitution and the by-laws of the organization made her services invaluable at both the local and provincial levels. Edna served in many capacities at branch and county level, acted as recording secretary at provincial conventions, and served as Provincial Home Economics Convener. She was elected to the Provincial Executive in 1970, finished Mrs. J.W. Westover's term as President, and served one year (1976) of her own term before illness forced her to resign. Edna worked on the revision of the constitutions at the provincial and federated levels.

Edna was presented with a Life Membership by Sherbrooke County in 1959 in appreciation of her work done as County President and with one of her special interests, the school fairs. In 1977 she received the Queen's Jubilee Medal and later was presented with the Award of Merit by the Federated Women's Institutes of Canada.

Members of the Women's Institutes formed an honour guard at her funeral, which was held on September 16th in Lennoxville, and later served refreshments.

On a personal note, Edna Smith was a very dear and special friend. I always welcomed the opportunity to visit her at her home and later at Rolling Hills. I thank her for enlarging my vision of the Townships, for sharing with me her interest in that magnificent animal, the Clydesdale, and for introducing me to her family, friends, and neighbours. She added

that extra dimension to our lives and we will miss her.

I join the members of the Quebec Women's Institutes in offering sympathy to her sister Alma, her brother-in-law Jack, and other members of her family.

Hazel M. Clarke

IN STITCHES

by M. Elizabeth
Jennaway-Eaman
Faculty of Education
McGill University



I am so pleased to see that a Trapunto wall hanging is on the 1988 competition list, as it is fun to do. It is a form of quilting and is best mounted and worked on a frame. I have used artist stretcher frames quite successfully and, since they can be bought in many sizes, you can make a wall hanging large or small depending on the space you are creating for. Make sure the fabric is stretched on grain. I have used staples to attach the fabric to the frame but other methods work very well, too. If you have a quilting frame, it is also very useful.

A few years ago people were buying pictures printed on fabric and creating a wonderful three dimensional effect using trapunto.

The entire picture, traced (invisibly!!) or freehand design, is basted to a light-weight backing with wrong sides together, and then each area of the picture to be highlighted is sewn around with small neat running stitches which penetrate both thicknesses. Start from the centre of the design and work outwards. It has been suggested that a large machine stitch could be used, but if the design is intricate, it is probably quicker by hand, and we would not want to make life too easy would we?

It is important that the entire area to be "trapunto-ed" is enclosed. Small slits are then made in the backing fabric only of each

enclosed area. Cottonwool, kapok, or fibre-fill is gently pushed into each enclosed area through the slits using a crochet hook or ball point needle. Each area is stuffed to the desired amount, and the slits are slip stitched back together. The secret is to keep the slits as small as possible and not to make more than are needed. If the wrong side is to be exposed, a lining can be attached later.

For the competition, as long as the back is exposed for judging, I feel that it should be acceptable to leave the wall hanging on a stretcher frame.

An Apple Pie Bee

Women gathering together to do anything is not unusual, but when they come together for an expressed purpose, then it becomes something special. The Franklin Centre WI have quilting bees and have done many other projects together, but they are outstanding when it comes to an apple pie bee.

The members organize their bee so that it can be held in time for the annual fall fair at Havelock. Supplies such as flour, lard and

eggs are brought by whoever is attending the bee. A study of the orchards within the area is made to see which of the early apples are ready and which member with an orchard will be willing to donate the apples. Finally, a decision is made as to which home is most convenient for space.

With all this organized the women gather early in the morning armed with a favourite rolling pin, paring knife, and other utensils. Members making dough find their places around the table and somewhere in the kitchen others prepare to peel apples. And the fun begins! And it is fun. The women speak with concern or interest about different people in the community. They poke fun at one or the other's home situation — no one is spared in this gentle ribbing. Recipes are swapped. Someone will tell a joke. An apple peeler will drop an apple onto the floor and accidentally tips the bowl of prepared apples in her lap while trying to retrieve the fallen apple. Those preparing the dough begin to get just a little careless with the flour by the time the third or fourth batch is made, and flour begins to appear in many other areas of the kitchen. Members filling pie shells suddenly look rather quilty and, when asked

what is wrong, admit reluctantly that they can't remember putting spices or sugar in the last two pies.

A break is taken for a pot luck lunch and the apple peelers have the opportunity to rest stiff backs and the dough rollers have a chance to sit down. Often, after lunch peelers and dough makers switch tasks and the bee resumes.

By 4 p.m. everyone is weary and with 180 pies made a halt is called. The pies are a golden, delicious delight that have fair goers returning every year to purchase one or two. Here is the recipe for:

An Old Fashioned Apple Pie

1 egg
1 tablespoon vinegar
4 3/4 cups flour
2 teaspoons salt
14 ounces lard
Melba apples
sugar
dash of cinnamon
butter

Combine egg and vinegar in measuring cup and add cold water to equal one cup.

Combine flour, salt, and lard and mix until crumbly. Then add liquid all at once. Work together and prepare dough for pie plate.

Peel and core washed apples. Slice into prepared shell and add sugar according to taste. Add dash of cinnamon and pat of butter and cover with top crust. Seal and slit top.

Bake in 450 degree F. oven for 10 minutes, then lower heat to 350 degrees F. for approximately 30 minutes.



Two members at this year's Havelock Fair, Pat Ocnas and Isabel Sutton, enjoy a brief break from a busy pie-selling day.

Women in Agriculture

A very enjoyable and informative afternoon was spent at the Lennoxville Research Station on April 30, 1987, where I attended a Women in Agriculture Conference which was sponsored by the Townships Educational Agri-Service.

The first speaker Diane Harkin, a member of the Eastern Ontario Women for the Survival of Agriculture, spoke on Ontario Farm Women in Action. She said she began as a "quiet" farm wife but now is a spokesperson for many women in Ontario. She attended farm meetings with her husband or in place of him and, being the exuberant woman that she is, she couldn't just sit back when ideas were put forward that didn't involve farm women or that suggested their work on the farm was unimportant. This was the start of finding other women who were in this situation but were afraid to speak up. The WSA was started to help these women. These farm women's groups have a code of ethics: creativity, courage to stand up, sense of caring, sharing of knowledge, resources, and laughter. She told us many stories and made us laugh with her as well as telling us some staggering statistics. One of these was that 86 children were accidentally killed in Ontario in the last 10 years and the average age was three.

Women are now being paid for their work on the farm, and men benefit from the two pay cheques when income tax time comes around. Women are also becoming active and accepted in men's groups. With more women taking to the barns and fields, the need for child care is necessary. Diane left us with a quote: "If it is to be, it is up to me."

Gwen Parker, QWI Past President spoke on the WI's past. She pointed out some of the issues that the WI promoted: pasteurization of milk in Canada, immunization for diphtheria, hot lunches in schools, medical inspection, community libraries, and presenting resolutions to government.

Muriel Duffy, Richmond County President, spoke on the present and future of the WI. She gave some of the aims: to encourage the development of agriculture and promote school fairs; to raise the standard of home-making, maintain the national traditions of handicrafts, and encourage the production and use of Canadian-made goods; to promote all education measures and, in particular, to promote, encourage, and assist education in rural areas, to teach and promote Canadian citizenship; to promote the welfare of children and young people and the health of the public by working with health authorities and social agencies.

As was stated to us: many of the aims of the WI are the same as the needs of farm women. Muriel appealed to the young women of the area to join a WI branch in order to keep these aims alive and to discuss the needs of the local farm women.

We heard a talk by Dorothy Middleton on educational programs for rural women. She spoke about the courses offered in Ontario on: survival techniques, bereavement, behaviour and learning problems, and stress. We then split into groups of five people, were given a paper bag and were asked to write a compliment for each person in the group. These compliments were to be read when we got home. While still in these groups we wrote down the personal, educational, and business needs of the group. These were recorded and will help in future conferences. We then went into workshop groups on: microwave cooking, gardening, and starting a small business. I was in the gardening workshop with Stewart Robertson.

At the close of the conference I picked my children up from the day care supplied by the organizers. I was pleased to be a part of the day and look forward to more such conferences.

Linda Hoy
Ascot WI

SAFETY FIRST

by Anne Robertson



Because of our concern with safety, especially farm safety, it is good to know that "Canadians were instrumental in writing new international safety standards for farm and forestry machinery," according to Mr. Larry Chanasyk, the chairman of the Canadian advisory committee brought together by the Standards Council of Canada to work on safety standards for agriculture machinery.

The farm machinery business is worth \$2 billion a year. The new international standards correspond closely with North American practices and should be a major advantage for Canadian manufacturers. The new safety standards are already being used in developing new North American documents. "Though the new standards are voluntary, their very existence will oblige North American manufacturers to follow them closely," says Mr. Chanasyk, "since they represent the state-of-the-art in agricultural machinery." This is important to manufacturers for insurance purposes as well as providing a uniform basis for designing equipment.

Some of the standards cover such things as protection from moving parts, safe distances to inspect, maintain or operate a dangerous part, besides the provision of operating manuals and warning notices. Specific requirements related to safety for the operator of machinery, general requirements for hitches, jacks, and supports, and protection of power related connections are other standards proposed.

One thing is very important and that is a safety conscious attitude on the part of the operator. Mr. Chanasyk says, "You can't idiot proof a machine and you can't design out carelessness."

WITH THE BRANCHES

ARGENTEUIL: Arundel made plans for Canada Day celebrations to be held at the Tree Farm. Brownsburg A letter was received from the Centre Local de Services Communautaires in reply to a petition concerning the placement of the English elderly where they cannot communicate, forwarded by Brownsburg WI and signed at the County Convention by many supporters. The letter signed by Mr. Bertin Legault, Director General of CLSC gave assurance of concern for the proper placement of both linguistic communities of the elderly and would communicate with the Social Services, whose responsibility this is. Also this request would be forwarded to the Comité D'accessibilité des Services aux Anglophones for review and possible solutions. Frontier Guest speaker, Mr. Norman Forbes, postmaster from Grenville, stated that many people are not putting the postal code in the right place when addressing an envelope and indicated that it should be placed at the bottom of the address. As well, he answered many questions, explained how the post office worked and passed out several pamphlets. Jerusalem-Bethany Guest speaker Mrs. Matthews demonstrated the assembly of a hanging basket and the care of it. Pioneer Heard an article which dealt with Canada's involvement with other countries and volunteer organizations around the world that are striving to eradicate, by vaccination, the six most common killer diseases that attack children in underdeveloped countries. The idea is to vaccinate every child on earth by 1990.

BALDWIN CARTIER: Lakeshore Guest speaker was Mr. Laid Ketchen, son-in-law of Mrs. Jessie Tucker who is a visiting Vice-President from the Durlston WI in England. Mr. Ketchen gave a very interesting talk on "A Girl's Best Friend" - diamonds. Unfortunately, there were no free samples. It was later agreed to form a sister branch with the Durlston WI.

BONAVENTURE: Black Cape Mrs. Catherine Campbell reported that she attended the fortieth anniversary of Broadlands Branch in May. Mrs. Campbell, who organized that branch in 1947, presented them with an arrangement of flowers on behalf of their branch. Grand Cascapedia A request for a donation from Gaspesian English Mentally Handicapped Association was favourably met. Port Daniel (motto) Foolishness grows by itself, there is no need to sow it. A letter read from "Save the Children Fund," they were very pleased to receive a certificate of appreciation for money received. Plans are in the making for their 65th anniversary.

MEGANTIC: Inverness A donation was sent to the St. Pat's Elementary School in Thetford towards school prizes. A quilt is in the frame at Evelyn Lennon's and the members are working on it a bit at a time. Kinneer's Mills On July 1, members, families, and friends gathered at the MacRae Grove at Kinneer's Mills to celebrate Canada Day and the anniversary of Citizenship. Hamburgers, hot dogs, sweets, drinks and a birthday

cake were enjoyed by everyone. Diedri Wenman, Directrice for the Women Farmers' Union, spoke on the management level of an agricultural enterprise. "Since time began, women have almost always been the unpaid employees or the silent partners, mostly invisible but so appreciated at mealtime. Women have been ignored on a political basis and have not been consulted on decisions which influence agriculture on a governmental level. There is an urgent need to change this situation and women have got to have a voice for the problems which concern them and their families. Time has come to improve the quality of life on the farm and to trace strong and easier footsteps for our sons and daughters to follow." Nature must have a sense of humor to let spring fever and housecleaning come at the same time.

SHEFFORD: Granby Hill During their May meeting at the home of Jane Rutherford, the members enjoyed the mild, sweet perfume of the large grapefruit tree she has growing in her living room. The seed had been planted by her daughter, Mary, about 21 years ago.

They've had a few edible grapefruit before, but never the number of blossoms as this year. In previous summers they have put the "tree" outside. Granby West For struggling tobacco farmers, another alternate is growing the yellow evening primrose. The oil is used by cosmetic manufacturers and marketed as a health food capsule to treat ailments like rheumatoid arthritis. Sew buttons on children's clothing with elastic thread; they are much easier for children to fasten. Waterloo-Warden Heard an article on Peanut Butter, telling of all the added ingredients in the process. Its better to buy it at a health food store where it can be ground fresh, while you wait.

I was pleased to hear of some wonderfully dedicated ladies in Waterloo-Warden who have decided to try again for another year, perhaps there will be another and another.

For those who have carried the burden thus far and for so long - keep up the good work, I know that it can't be easy.

Darleen Sabetta
QWI Publicity

HANDICRAFT COMPETITIONS 1988

QWI Competition

Braided Rug (Also Quebec Textile Competition): oval; not less than 50 cm in its smallest dimension; fibre or materials optional.

Adult Kimono (Also Quebec Textile Competition): material optional.

Teddy Bear: size and style optional; fabric suitable to article.

Trapunto Wall Hanging: framed, back visible; size and theme optional.

Set of 4 gift cards: size - not less than 2" by 4" (5 cm by 10 cm); not more than 4" by 4" (10 cm by 10 cm); technique and material optional.

J. & P. Coats Competition

Hardanger Centrepiece (Also Quebec Textile Competition): Using J. & P. Coats Cronita for Kloster stitch; using J. & P. Coats 3-strand Anchor embroidery thread for other stitches; size - not less than 25 cm in its smallest dimension.

Knitted Cushion Cover, Front and Back (not stuffed): using Red Heart yarn; style and size optional.

Crocheted Man's Scarf: using Red Heart yarn; style and size optional.

Note: Samples of materials used must be attached to articles.

Quebec Textile Handicraft Competition

Weaving

1. Tablecloth: technique: Bronson or swedish lace; warp, weft, and finishing optional; size: not less than 125 cm in its smallest measurement.

Weaving and Making-up

2. Lady's Skirt: technique and style optional; warp and weft optional; suggestion: originality in the style, technique, fibres, and colour.

Sewing

3. Adult's Kimono: material optional.

Knitting

4. Lady's Light Pullover: knitted; with or without sleeves; threads optional.

Fancywork

5. Braided Rug: braiding technique optional; oval shape; fibres or materials optional; size: not less than 50 cm in its smallest measurement.

6. Centrepiece: technique: Hardanger embroidery; appropriate material threads; size: not less than 25 cm in its smallest measurement.

Samples required. For complete information on all competitions, please check at branch level.

Newsmakers

ON CAMPUS

DR. ELLIOT BLOCK, Department of Animal Science, has been named the Associate Director, Macdonald College, of the Nutrition and Food Science Centre which is located on the downtown campus of McGill University. He has also been appointed Secretary-Treasurer of the Association of Faculties of Agriculture of Canada.

MARCEL J. COUTURE, Associate Dean, Community Relations, and Director of the Diploma in Agriculture Program, has been named Vice-President of the Montreal Farmers Club. As well, he was named Vice-President (1987-88) of the Canadian Association of Diploma in Agriculture Directors.

HENRY GARINO, Director of Extension, was asked to join a World Food Strategies Committee by Dr. J. Neff of the University of Guelph.

DR. JORDAN INGRAM, has been appointed Chairman of the Department of Microbiology.

PROFESSOR A.R.C. JONES, Woodland Section, Department of Renewable Resources, has been invited to become a member of the Committee of Coordination of Forest Research in Quebec and was recently presented with an Honorary Membership in the International Dendrology Society, which is a European group of 900 members centred in Switzerland and the United Kingdom.

DR. ROGER KNOWLES, of the Department of Microbiology, was elected Fellow of the Royal Society of Canada.

DR. ERIC NORRIS, has been appointed Chairman of the Department of Agricultural Engineering.

DR. SHERMAN TOUCHBURN, Department of Animal Science, has been named to the Canadian National Committee of the International Union of Nutrition Sciences. He was nominated to this position by the Canadian Society of Nutrition Sciences.

News from the Department of Plant Science: GREG BRIDGER has completed his Master's program, has won an NSERC scholarship, and has started on a PhD program at the University of Guelph. ANDREE DESROCHERS's thesis was rated excellent by all examiners, and she has left for B.C., where she will be doing her PhD studies.

McGill Associates

A Challenge '86 Summer Employment grant allowed three dietetic students, Catherine Atchison, Louise de Courval, and Monique Pagé, under the guidance of Dr. Shirley Weber of the School of Dietetics and Human Nutrition, to study the lunch box habits of students in extended kindergarten classes in the Greater Montreal area. (See *The Macdonald Journal*, November 1986) The findings from the study as well as suggested menus for lunches and for snacks, sandwich fillings, and other hints were printed in a bilingual pamphlet which was suitable for immediate distribution to those schools that helped in the project. Dr. Weber and the students hoped, however, that it would be possible to have a more suitable pamphlet printed for wider distribution. Thanks to a

grant from the McGill Associates, that hope has become a reality.

"We thought the information was helpful, particularly for young mothers and, therefore, the project deserved our support," Philip E. Johnston, Vice-Chairman of The Royal Trust Company and President of the McGill Associates, said recently. "Our group," he added, "particularly enjoys supporting some of the smaller, one occasion only projects."

The McGill Associates is the oldest fund raising organization at McGill and plans are being made to celebrate their up-coming 50th anniversary. An interesting point is that the members are not McGill graduates; they are men and women who believe in McGill and wish to support the university. There are some 600 members at present and Mr. Johnston said that new members are always welcome. The Associates usually have a dinner, a lecture series, or seminars during the year. Most of the members are in the Montreal area, although a few are in Toronto or elsewhere. A committee is responsible for selecting the various projects to sponsor. Mr. Johnston said that in the recent past they have



Philip E. Johnston, President of McGill Associates, and, l to r, Monique Pagé, Dr. Shirley Weber, and Catherine Atchison admire the new "Lunch Box Project" pamphlet.

supplied a piano for Pollack Hall, purchased a racing scull for the McGill rowing team, subscriptions for a special journal, and helped sponsor McGill Open House.

Publishing "The Lunch Box Project" is another of their accomplishments which is particularly gratifying to Dr. Weber and the students who worked on the project.

OFF CAMPUS

DOUGLAS WATERSTON, BSc (Agr) '45, retired this past summer after more than 20 years as public information officer for the University of Guelph. After being on the staff of the Family Herald and Weekly Star and the Farmers' Advocate, Doug became Guelph's first information officer.

FRANK W. CALDER, BSc (Agr) '46, retired recently from Agriculture Canada's Research Branch.

ROBERT (BOBBY) NESS, Dip '48, represented the Centre d'insemination artificielle du Quebec Inc., at the ribbon-cutting ceremony which marked the opening of the new Semex Canada headquarters on September 9, 1987, in Guelph, Ont. Some 200 representatives of Canada's animal industry attended the ceremonies.

W. DAVID HOPPER, BSc (Agr) 50, is now senior vice president of policy, planning, and research for the World Bank.

WALTER GRANT, BSc (Agr) '52, has been appointed chairman of the Nova Scotia Dairy Commission. He recently retired from the position of Deputy Minister for the N.S. Department of Agriculture and Marketing. (See *The Macdonald Journal*, November 1986.)

ROLLIE HAYMAN, BSc (Agr) '66, director of extension for the N.S. Department of Agriculture and Marketing, was elected to represent the scientific societies affiliated with the Agricultural Institute of Canada on the National Executive. Rollie is immediate past president of the Canadian Agricultural

Economics and Farm Management Society which he represents on the AIC National Council.

DOUGLAS LOUSLEY, BSc (Agr) '68, is with the Canadian Embassy in Caracas, Venezuela.

CHARLES LAPOINTE, BSc (Agr) '74, has been appointed general director of Ralston Purina's Feed Division for Quebec. Charles will be responsible for sales, production, finances, and administration for Quebec and his office will be at the Lasalle plant. Charles joined Ralston Purina eight years ago and was in the national marketing division and then in sales and operations.

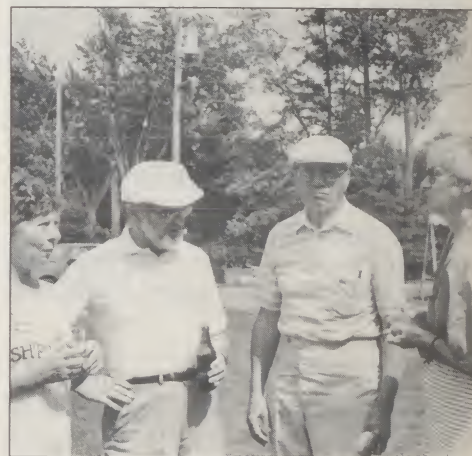
At the 50th anniversary annual dinner of the Montreal Branch of the Canadian Food Services Executives Association a Macdonald graduate and a student majoring in Dietetics, who is a junior member, received awards and another Mac graduate became a member of the Board of Directors. THERESA RIVERA-MILDENHALL, BSc (FSc) '77, received the Executive of the Year Award, CAROLE FOURNIER, BSc (FSc) '80, is the Second Vice-President of the Board of Directors, and SYLVIE RENAUD received the Gold Plate Award which is sponsored by Goodhost Foods Ltd.

PAUL JENSEN, BSc (Agr) 82, MSc (Agr) 85, has been with Les Vivaces Québécoises, Blainville, Que., as production manager for product development since June 1987.

News from CUSO of Mac grads: DAVID SMITH, Dip '82, has completed his project in Mozambique and has returned to Quebec. REMI GAUTHIER, BSc (Agr) '83, MSc (Agr) '86, has left for Indonesia where he will be working on environmental management programs through universities. ALEJANDRO ARGUMENDO, Dip '86, is on a CUSO project in Ecuador where he will be working in agricultural extension with native (Quecha-speaking) people.

On August 18, 1987, at the World Veterinary Congress in Montreal, the Canadian Veteri-

nary Medical Association (CVMA) presented an Honorary Membership to NELLA MCKELLAR. NELLA was on staff in the Registrar's office and was also circulation manager of *The Macdonald Journal* for 14 years. Now semi-retired, Nella joined the CVMA as the Managing Editor of *The Canadian Veterinary Journal* and the *Canadian Journal of Veterinary Research* in 1968.



Nella McKellar, is seen with Helen Harrigan from the Dean's Office, Dr. Julius Frank, MSc (Agr) '47, and Ralph K. Bennett, BSA '27, at the Ottawa Barbecue held this past summer at the home of Gib Patterson.

The Fair Circuit

Macdonald College had a booth at some 16 Quebec Fairs this past summer and also attended the Quebec Young Farmers' Calf Rally. Whenever people from Macdonald get an opportunity to visit in the community, one of the most important and rewarding aspects of that visit is an opportunity to meet with Macdonald graduates, to bring them news from Macdonald and, most importantly, to hear what they have been doing. Claude Borduas was one of the people manning the booth this summer and brought us news of a few of the visitors as well as the participants at a couple of the fairs he attended.

DAVID W. SHUFELT, BSc (Agr) '61, raises and breeds Ayrshires in East Farnham. JOANNE ENRIGHT VANDERLINDEN,

BSc (Agr) '80, is operating a farm in Nova Scotia with her husband Harry, also a Mac graduate. CHRISTIAN GASSER, Dip '82, is responsible for the dairy herd at Les Fermes Gasser Ltee of Pike River. LOUIS BLAIS, BSc (Agr) '83, is working in the poultry production sector of the J.O. Levesque family owned-company in Bedford. He is involved in the management, genetic improvement, and disease prevention aspects of the enterprise. Louis is also working on a Master's program in the Department of Animal Science, with Dr. Roger Buckland. FRANCE GROULX, BSc (Agr) '83 is working as a journalist for La Terre de Chez Nous. CHRISTIAN KLOPFENSTEIN, Dip '84, is a second-year student in veterinary medicine at St-Hyacinthe and during the summers he works on the family farm in Clarenceville. JEAN KEURENTJES, Dip '85, is working on the family farm in Henryville and is mainly responsible for the dairy cattle herd. PASCALE TREMBLAY, BSc (Agr) '85, is editor for La Société d'éditions SELC Inc. in Bedford. JULIE PAQUETTE, BSc (Agr) '87 is working as a part-time technical adviser for Nutri-Vert Inc. of Frelighsburg, and she is responsible for the marketing of Natagri bacterial manure activator for the Bedford region.

MARIE-JOSEE GOUIN, at present a Macdonald student in Animal Science, exhibited Simmentals from her family's farm in Coleraine. At the Victoriaville fair, her 18-month old heifer was chosen as the Reserve Junior Champion. Marie-Josée also participated at fairs in Thetford Mines, Sherbrooke, and Quebec. Also at Victoriaville, twins, GILLES and GUY ROI, of St. Pierre de Broughton, who are students in the Diploma program, showed several of the family's Ayrshires. One was chosen as Junior Champion, another Grand Champion as well as the cow having the best udder.

What's Happening?

Where are you? What are you doing? What have you heard about your fellow grads? New jobs, promotions, awards, retirements. From a first job, through all the steps up the ladder, to retirement, and post-retirement - keep us informed on what's happening so we can pass the news along to your fellow grads. Any news you would like to share with us would be welcome. We delight in hearing from you and about you. Send information to Hazel M. Clarke, Macdonald Journal, Box 284, Macdonald College, Que. H9X 1C0

DECEASED

C. BURTON DALTON, BSA '31, of Ottawa, Ont., on July 18, 1987.

JAMES ALEXANDER (TRICK) NESS, Class of '46, BCom '48, at Brighton, Ont., on September 15, 1987.

MARGARET (MACDOUGALL) TAULBEE, BSc (HEC) '49, at Pittsburgh, Pa., on September 3, 1987.

GORDON A. KINNAIRD, BSc (Agr) '52. No further information.

JEAN (TAYLOR) HOW, BSc (HEC) '57 of St. Andrews, N.B., on July 22, 1987.

AREND C. MARKIES, BSc (Agr) '64, of Montreal, Que., on July 15, 1987.

OVIDE LAURENT, a staff member of Macdonald College for 50 years until his retirement, passed away on July 16, 1987. Mr. Laurent started his career as an apprentice plumber at the age of 15 and finished at the age of 65. He will be remembered for his quiet efficiency, his cheerful helpfulness, and his sincere interest in the college. He knew the history of every pipe that had been laid and the workings of the heating and

plumbing systems which were quite intricate in the older buildings. He was also a community-minded person who contributed a great deal to make Ste. Anne de Bellevue one of the best communities on the lakeshore. Those who knew him will remember him with gratitude and fondness as a member of the Clan Macdonald.

COMING EVENTS

November	4 Quebec Farmers' Association Annual Meeting
November	5 Scholastic Awards Banquet
November 12-13	Annual Meeting of the Quebec Entomological Society
November	21 REAP Conference
November	26 Diploma in Agriculture Graduation Ceremonies
January	23 Woodmen's Competition
February	2 QFA Dairy Day
February	10 Founder's Day
March	12 Raptor Research Centre Raffle Draw

Farm Accounting

A correspondence course in farm accounting will soon be offered to the English farming community of Quebec. Macdonald College is finalizing the translation and updating of this course for MAPAQ. Do not miss the details in the next issue of the Macdonald Journal.

Keeping in Touch

Interested in New Department

It was with particular interest that I read the August issue of the Macdonald Journal, having completed my degree in Food Science at Macdonald and recently finishing my Masters of (Food) Science at Guelph. I will be interested in following the progress of the department under the new direction of Dr. Fred van de Voort. The articles on food irradiation and modified atmosphere packaging were also of interest to the staff here at the Horticultural Research Institute of Ontario.

Joy Shinn, BSc (FSc) '84
Vineland Station, Ont.

Congratulations!

I just recently graduated (December 1986) from Macdonald College and look forward to receiving the Journal. Congratulations on a very interesting magazine.

Louise de Courval,
Montreal, Que.

Correction

The May 1987 issue of the Macdonald Journal was very much appreciated. Congratulations on achieving the goals which you set for the Journal. I would, however, like to point out an error in the recipe for the Cream Cheese Frosting on page 31. It should read 3600 grams of cream cheese. It took a B. Com student to point out the error to me. Apologies to the readers.

Blanche B. Olejnik
Faculty Lecturer
School of Dietetics and Human Nutrition

It's Fantastic!

The new format of the magazine is fantastic; it gives a lot of credibility to the Macdonald campus and is much more attractive. It is now a source of information that I will keep in my library for future reference. The new Journal helps me keep in touch with what is happening in agriculture and with my colleagues. I really appreciate the work that all of you did for the magazine.

I started on an MBA in September. Prior to that since graduating from Macdonald in '84 I was working for a pharmaceutical company.

Guy Le Houillier
Montreal, Que.

The Benallan Farm

I am very impressed with the new look of the Macdonald Journal. You are doing a tremendous job!

In the May 1987 issue I found your article entitled "Common Sense and Technical Know-How" of particular interest. With your permission I would like to reprint this article in the July issue of the Canadian Ayrshire Review, as I believe Ayrshire enthusiasts around the world would also enjoy the Hammonds' story of their Benallan Farm.

Best wishes for continued success with your publication.

Kenda Allen, A.I.T.,
Editor
Canadian Ayrshire Review

Benallan Update

We have received many favourable phone calls re the Diploma Corner in the May issue and the men were very happy with the presentation. To update a couple of changes since then: 1) a partnership has been formed. It is now "Benallan Farms" - Hammond Bros. 2) an additional farm has been purchased.

A correction re cost/litre. There was an error in the calculation: it should read 11 cents/litre. To explain the correction: when the cost was originally calculated we were using the cost of the top group's feed but using the average production rather than the top group's production.

Frances Hammond
Lachute, Que.

Enjoying Retirement

The Macdonald Journal is now my major contact with the college. From the Journal I get a pretty good overview of events and changes and for that reason I value it.

We have just returned (July) from two months in Virginia. Although we were in the mountains of the southwestern part, May turned out to be a warm summery month. Jeanette and I drove with our daughter Janet to Duke University in Durham, North Carolina, where she worked on sabbatical for a time. Duke seems a truly fine institution and its architecture is worth viewing in its own right. While returning we passed through the Great Smokies National Park, a region I have always wished to visit because of the wonderful mix of southern and northern species found there in flowering forest trees and plants. If anyone has ever been in that region, possibly a first recall will be the wonderfully cool and fresh air of the high mountains.

Regards to all,

C.D. Taper,
Halifax, N.S.

Editor's Note: Dr. Jean David tells me that he has received many favourable comments on the Profile on him in the August Journal, but we would like to correct two points. First, Pleun van der Wel graduated in 1969, not 1979 as written, and, second, those '74 crocus bulbs were, of course, planted in the fall of '73, not '74, as written.

Good Reading in February '88

Special features on "Horticulture in a Changing Environment," a Profile on Jean McHarg, Award Recipient and new President of the Graduates' Society, and lots more.

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